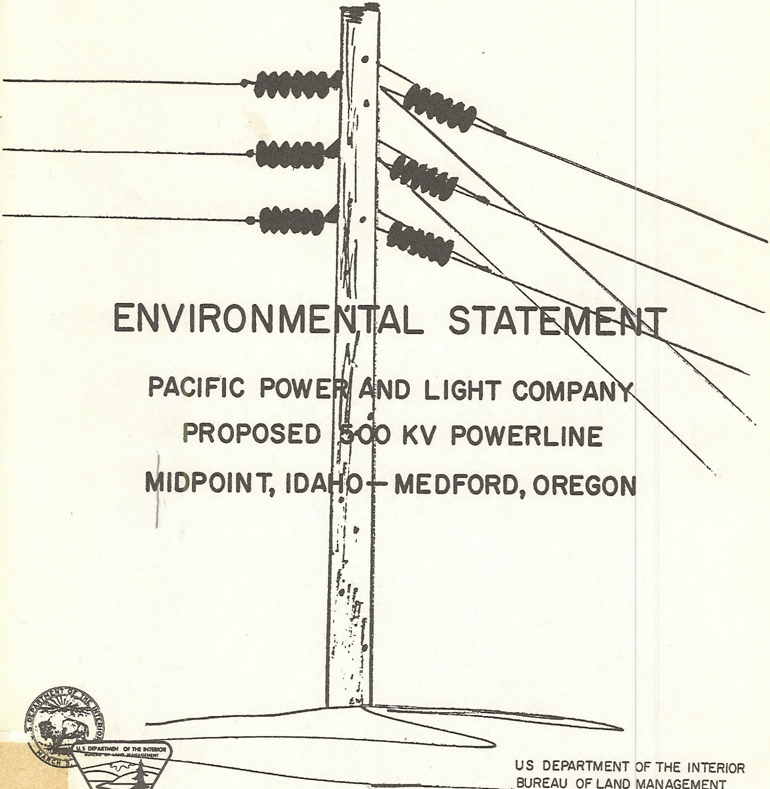
FINAL



ENVIRONMENTAL STATEMENT

PACIFIC POWER AND LIGHT COMPANY
PROPOSED 500 KV POWERLINE
MIDPOINT, IDAHO — MEDFORD, OREGON

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

US DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FINAL

ENVIRONMENTAL IMPACT STATEMENT

Proposed

Midpoint, Idaho - Medford, Oregon
PACIFIC POWER & LIGHT CO.
500 Kv TRANSMISSION LINE

Bureau of Land Management

Department of the Interior

Curt Berklund
Director, Bureau of Land Management

SUMMARY

( ) Draft (X) Final Environmental Statement

Department of the Interior, Bureau of Land Management

1. Type of Action: (X) Administrative ( ) Legislative

2. Brief Description of Action: Pacific Power & Light Company proposes to construct, operate, and maintain a 500,000 volt electric transmission line between the Midpoint, Idaho substation and a new substation site northeast of Medford, Oregon.

3. Summary of Environmental Impacts: The proposed action will result in an increment of damage to the soil, vegetation, wildlife populations and habitat, cultural and esthetic resources for a varying distance each side of the 483-mile long right-of-way.

4. Alternatives Considered:

   A. No Action (Rejection of the Application)

   B. Alternatives

      1. Eight alternative routes

      2. Alternate project designs

      3. Alternate power sources

5. Comments on the Draft Statement were Requested from the Following: (See attachment)

6. Date Statement Made Available to CEQ and the Public:

   Draft Statement: August 20, 1976

   Final Statement:

Attachment, Item 5

Federal Agencies

Advisory Council on Historic Preservation *

Department of Agriculture
- Forest Service *
- Soil Conservation Service *

Department of Defense
- Corps of Engineers
- Mountain Home Air Force Base

Environmental Protection Agency *

Department of the Interior
- Bonneville Power Administration *
- Bureau of Mines *
- Bureau of Reclamation
- Bureau of Outdoor Recreation *
- National Park Service *
- U.S. Fish & Wildlife Service *

Department of Transportation
- Federal Aviation Administration

Water Resources Council

State and Local Government

Idaho State Clearing House *
Idaho State Historic Preservation Officer *
Idaho Public Utilities Commission
Oregon State Clearing House *
Oregon State Historic Preservation Officer *
Oregon Public Utilities Commissioner *

Boards of County Commissioners
- Ada County, Idaho
- Canyon County, Idaho
- Elmore County, Idaho
- Gooding County, Idaho
- Jerome Coumty, Idaho
- Twin Falls County, Idaho
- Harney County, Oregon
- Jackson County, Oregon
- Klamath County, Oregon
- Lake County, Oregon
- Malheur County, Oregon

Interest Groups

Ada County Fish & Game League
Audubon Society
Desert Trail Association
Friends of the Earth *
Idaho Environmental Council
Idaho Historical Society *
Idaho Wildlife Federation
International Society for Preservation of Mustangs and Burros
Izaak Walton League
League of Women Voters *
National Wildlife Federation
Nature Conservancy
Oregon Environmental Council *
Oregon High Desert Study Group
Oregon Wildlife Federation
Sierra Club *
Wildlife Management Institute *

* Agencies and organizations which prepared written responses to the Draft Statement.

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Chapter I - Pages 31 & 33 VTN, Inc.

Chapter II - Pages 57, 64, 71 - Oregon Department of Fish & Wildlife

PREFACE

Pacific Power & Light Company (Pacific), with corporate headquarters in Portland, Oregon, has filed a preliminary right-of-way application with the Bureau of Land Management, United States Department of the Interior, to construct a 500,000 volt alternating current electric transmission line from the Midpoint substation in south-central Idaho approximately 391 miles westerly to the Malin substation southeast of Klamath Falls, Oregon. The application is for a specific route between the two substations.

A second preliminary right-of-way application has been filed with the Bureau of Land Management by Pacific to extend the proposed transmission line from the Malin substation northwesterly about 92 miles to a proposed substation in the Table Rock area about 5 miles northeast of Medford, Oregon.

The proposed Midpoint to Medford transmission line would transmit electrical energy generated by Pacific at the Jim Bridger, Wyodak and other Wyoming facilities, which is surplus to its Wyoming load requirements, to load centers in the Pacific Northwest and southwestern Oregon in particular.

About 65 percent of the proposed transmission line would cross lands owned by the United States, including national resource lands administered by the Bureau of Land Management, Department of the Interior and the Fremont National Forest, United States Forest Service, Department of Agriculture. The application to cross lands of the United States would result in a Federal action, granting or denying a right-of-way permit, and as the proposed project would have significant impacts on the human environment, the Secretaries of Interior and Agriculture determined that an Environmental Impact Statement, in accordance with Section 102.2(c) of the National Environmental Policy Act (Public Law 91-190) should be prepared.

The vast majority of the public lands of the United States potentially impacted by the proposed transmission line are administered by the Bureau of Land Management, Department of the Interior. Therefore, the Bureau of Land Management was designated as the lead agency to prepare the Environmental Impact Statement. The Director, Bureau of Land Management delegated the responsibility for preparing the Statement to the Oregon State Director.

Impacts of the proposed action are analyzed wherever they are expected to occur. For analysis purposes a minimum of one mile on each side of the proposed right-of-way centerline was studied. However, for certain environmental elements such as wildlife, recreation, esthetics and socio-economic values, geographic boundaries were not limited as the potential impacts of the proposal are further reaching.

The Statement was prepared by an interdisciplinary team of specialists from the BLM Oregon and Idaho State Offices and the U.S. Forest Service, Fremont National Forest. Prior to preparing the Statement the team covered Pacific's proposed route and alternative routes, shown on maps A and B in the Appendix, by helicopter, fixed wing aircraft and ground transportation.

Repetition, by environmental components, exists throughout the statement. This is for the benefit of the reader who may only be interested in one aspect of the statement, such as wildlife or recreation, and not interested in reading the entire document.

The Draft Environmental Statement was filed with the Council on Environmental Quality in August, 1976 and over 400 copies disseminated for public and private review.

This Final Environmental Statement incorporates pertinent comments received during the review and comment period.

The maps, A through A - 3 and B through B - 3 appended to the Draft Statement are not printed with this Final Statement. However, a limited supply of the maps are available at the Office of the State Director, Bureau of Land Management, P. O. Box 2965, Portland, Oregon 97208.

CHAPTER I

DESCRIPTION OF THE PROPOSED ACTION

BACKGROUND AND HISTORY

Pacific Power & Light Company is in the process of constructing generating facilities in Wyoming to utilize its strippable, low sulfur coal in that state. These facilities, Jim Bridger and Wyodak, together with existing generating facilities would provide electric generation in excess of Pacific's Wyoming load requirements during the immediate future. The Jim Bridger generating station was covered in the Jim Bridger Environmental Impact Statement, September 30, 1971, and the Wyodak facility covered in the Powder River Environmental Impact Statement, October, 1974.

To utilize the large blocks of excess Wyoming power, Pacific proposes to transmit it to load centers in the Pacific Northwest, and southwestern Oregon in particular. Since Pacific has insufficient transmission capacity from Wyoming to the Northwest to transmit this power, they propose to construct a new 500,000 volt powerline between the Midpoint, Idaho substation and a proposed new substation near Medford, Oregon. To implement this proposal Pacific filed two applications with the Bureau of Land Management, U.S. Department of the Interior, for a 175-foot-wide right-of-way across lands of the United States between Midpoint, Idaho and Malin, Oregon and between Malin, Oregon and Medford, Oregon. (FIGURE I-1)

The applications were filed under the Act of March 4, 1911 (36 Stat. 1253; 43 U.S.C. 961), as amended. The Act authorizes the head of the department having jurisdiction over the lands, under regulations fixed by him, to grant an easement for rights-of-way for a period not exceeding 50 years, over and across public lands and reservations of the United States, for poles (towers) and lines for the transmission and distribution of electrical power. That department head may also issue rights-of-way for the placing of structures and facilities to the extent of 200 feet on each side of the center lines and poles, not to exceed 400 feet by 400 feet for superstructures and facilities.

This Act has been repealed by Section 706 (2) of the Federal Land Policy and Management Act of 1976, 90 Stat. 2743, 2793. Accordingly, as indicated in Organic Act Directive No. 76-15 (December 14, 1976), the pending applications will be processed under the authority of Title V of the 1976 Act.

This Act authorizes the Secretary of Interior with respect to the public lands, and the Secretary of Agriculture with respect to National Forest lands, to issue rights-of-way for (among other things) system for generation, transmission and distribution of electric energy. It provides the Secretary concerned shall specify the boundaries of such rights-of-way,

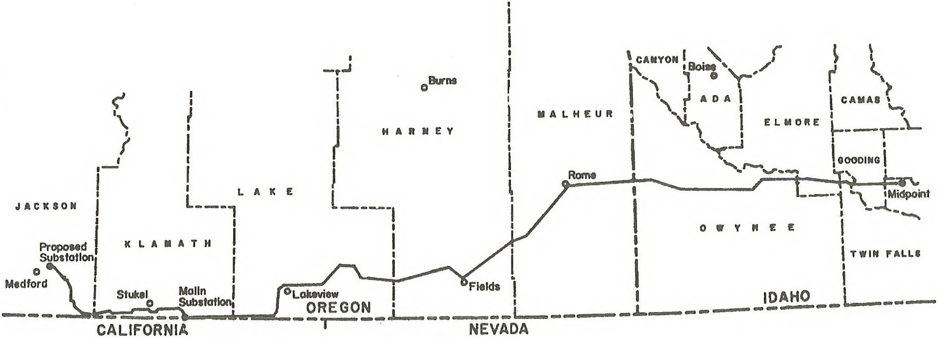


FIGURE I-1
—— Proposed Route, Midpoint-Malin-Medford

limiting it to the ground necessary for the facilities and operation and maintenance of the project. He may authorize the use of such additional lands as he determines necessary for construction of the project or access thereto. The duration of the right-of-way shall be for a reasonable term in light of all circumstances concerning the project.

The Secretary shall insert in each right-of-way those terms and conditions necessary to carry out the purposes of the Act, and minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment; and require location of the right-of-way along a route that will cause least damage to the environment taking into consideration feasibility and other relevant factors.

Section 503 of the Act provides that the Secretary shall utilize "rights-of-way in common" to the extent practical, and each right-of-way shall reserve the right to grant additional right-of-way or permits for compatible use on or adjacent to the right-of-way granted under the Act.

The Act also provides that all public lands be inventoried with priority given to areas of critical environmental concern (Section 102(a)(11), and roadless areas reviewed as to their suitability for preservation as wilderness (Section 603). The inventory and analysis requirements for compliance with these two provisions of the Act have a great potential for delaying any decision on Pacific's right-of-way application because regulations and procedures for compliance have not yet been developed, and some of the land crossed by the proposal could qualify under the roadless provisions of the Act.

The surplus Wyoming power would be transmitted over three newly constructed 345 KV transmission lines from the Jim Bridger area to the Borah Substation near American Falls, Idaho. These lines were also covered in the Jim Bridger Environmental Impact Statement. Between the Borah and Midpoint substations it would be transmitted over lines owned by Idaho Power Company. These Idaho Power Company lines are under a Federal Power Commission license. In order to transmit the additional energy, Idaho Power Company has made application to the Federal Power Commission to upgrade two 230 KV lines to 345 KV capacity. This upgrading would consist of replacing existing insulators with larger ones, using the same poles and conductors.

Prior to filing the application, Pacific requested permission to enter the public lands of the United States for the purpose of initial survey work and section corner location for control purposes. This was granted in July, 1974, with the understanding that such permission in no way would imply approval of the proposed route as the final route selection.

The Applicant provided the Bureau of Land Management, U. S. Forest Service and other interested agencies and individuals with copies of its "Environmental Assessment for Proposed 500 KV Transmission Project," Malin, Oregon to Midpoint, Idaho in May, 1975. Pacific's "Environmental Assessment for Proposed 500 KV Transmission Project," Malin to Medford, Oregon, was received in November, 1975. Both documents were used for analysis purposes. Project data and information was also furnished directly to the EIS team by Pacific.

FEDERAL ACTIONS

Bureau of Land Management

The preliminary right-of-way application filed by Pacific for the proposed 391-mile-long transmission line between the Midpoint, Idaho and Malin, Oregon substations would cross 105 miles of Federal land administered by the Bureau of Land Management in Idaho and 147 miles in Oregon, for a total of 252 miles. A 175 foot-wide right-of-way across the 252 miles would require 5345.45 acres.

The right-of-way application for the 92-mile-long line between the Malin Substation and the proposed substation near Medford, Oregon would cross 24 miles of Federal land administered by the Bureau of Land Management. A 175 foot-wide right-of-way across the 24 miles would require 509.09 acres.

The Oregon and Idaho Bureau of Land Management State Directors, by authority delegated to them, are authorized to make the decision on Pacific's right-of-way applications relative to these Federal lands. This decision could be:

1. Approve the application as filed and issue a right-of-way permit, with necessary stipulations, to Pacific.
2. Reject the application in its entirety.
3. Approve the application in part and reject in part.

If a right-of-way permit is issued for the transmission line:

1. Additional permits may have to be granted to Pacific for any access roads that may be constructed across Federal lands out side of the 175-foot-wide transmission line right-of-way.
2. Any commercial timber to be removed on the right-of-way would be sold to Pacific through a Negotiated Timber Sale Contract.

U.S. Forest Service

The proposed Midpoint to Malin transmission line would cross 30.5 miles of land within the exterior boundaries of the Fremont National Forest in the vicinity of Lakeview, Oregon. Of this amount, 17 miles would cross reserved Federal land administered by the Forest Service and 13.5 miles would cross privately owned land within the National Forest boundary. A 175 foot-wide right-of-way across the 17 miles would require 360.61 acres. The proposed Malin to Medford, Oregon transmission line does not cross any National Forest.

The Regional Forester, Region 6, U.S. Forest Service, U.S. Department of Agriculture could have the same action as Bureau of Land Management State Directors for that portion of the right-of-way application wherein National Forest lands are affected.

No other Federal lands administered by other agencies would be crossed by the proposed transmission line.

OTHER ACTIONS

States of Idaho and Oregon

Pacific has filed applications with the Public Utility Commissions, States of Oregon and Idaho for a Certificate of Public Convenience and Necessity for the proposed Midpoint to Medford transmission line. If the applications are approved, the respective Public Utility Commissioners would issue the Certificate of Public Convenience and Necessity to Pacific, which would permit Pacific to condemn right-of-way and access across private land.

About 5.5 miles of the proposed transmission line would cross land owned by the State of Idaho. The State of Idaho, Bureau of Lands within the Department of Lands would issue a right-of-way across such state land. A 175 foot-wide right-of-way across the 5.5 miles would require 116.67 acres.

The proposed line would cross approximately 11.5 miles of land owned by the State of Oregon. A right-of-way to cross these lands would be issued by the Oregon State Land Department. A 175 foot-wide right-of-way across the 11.5 miles would require 243.94 acres.

In addition, if the Oregon Public Utilities Commissioner issued a Certificate of Public Convenience and Necessity to Pacific, the Oregon State Department of Energy would concurrently issue a Siting Permit, covering both state and private land in Oregon.

Highway crossing permits would have to be obtained.

Counties

The proposed transmission line would cross portions of Jerome, Gooding, Twin Falls, Elmore and Owyhee Counties in Idaho and Malheur, Harney Lake, Klamath and Jackson Counties in Oregon.

Zoning ordinances vary by county. However, transmission lines are generally permissible in areas other than residential, rural residential and farm districts. To cross such areas, Pacific may have to obtain a Conditional Use Permit from the respective Boards of County Commissioners.

APPLICANT'S PROPOSED ACTION

Purpose and Need

According to Pacific, the proposed transmission line is to serve the following purposes: (1) provide a means of transferring surplus electrical energy from Wyoming coal-fired thermal plants (TABLE I-1) to load centers in the Pacific Northwest, (2) provide a direct means of supplying power to meet the energy growth needs of southern Oregon, (3) to be available for backup transmission capacity from the Pacific Northwest to the Rocky Mountain area in emergency situations, and (4) to contribute to the reliability of the interconnected transmission grid in the Pacific Northwest.

The complex, interconnected transmission grid of the Pacific Northwest integrates the Region's hydroelectric and thermal generating facilities. It also integrates these facilities with the equally interconnected facilities of other grid systems in the western United States and Canada.

The Northwest Power Pool (NWPP) is the principal coordinating agency of the Northwest Power System. The NWPP is subdivided into three geographic areas: (1) The East Group, including Montana, Utah and southern Idaho; the West Group, comprised of Washington, northern Idaho, Oregon and northern California; and (3) British Columbia, Canada.

FIGURE I-2 depicts the southern portion of the Northwest transmission grid. For more comprehensive perspective, consult the Western Systems Coordinating Council Map C in the Appendix.

The following data on the need for the proposed transmission line was excerpted from information provided to BLM and the Oregon and Idaho Public Utilities Commission by Pacific Power & Light Company. (Pacific, 1975)

The line would deliver power directly into the load center of Pacific's Southwestern Oregon system at Medford. The load in this area is estimated at over 1100 MW in the winter of 1978-79.

The power to be delivered over the proposed Midpoint-Malin 500 kV line will at times create some near-term surplus in the Southern Oregon load area. If required, this power will then be wheeled via BPA's main grid to Pacific's other load areas or be made available to other entities as needed.

It is expected that future load growth in Southern Oregon will ultimately require the full capability of the line.

Pacific's 230 kV system now serving this area will be used to distribute this power from Medford with additional 230 kV lines to be added as required in future years.

The per capita electric energy demand in the Pacific Northwest has increased faster than population. This relationship is illustrated in FIGURE I-3.

TABLE I-1

PACIFIC POWER & LIGHT COMPANY WYOMING GENERATING FACILITIES

Plant	Nameplant Rating mw	Pacific Share	Status	Service Date
Dave Johnston	750	100%	In Service	----
Trona	15	100%	In Service	----
Jim Bridger Unit #1	500	J.O.1/	In Service	----
Jim Bridger Unit #2	500	J.O.1/	In Service	----
Jim Bridger Unit #3	500	J.O.1/	In Service	----
Wyodak	330	60%	Under Const.	1978
Jim Bridger Unit #4	500	J.O.1/	Const. Pending	Winter 1979

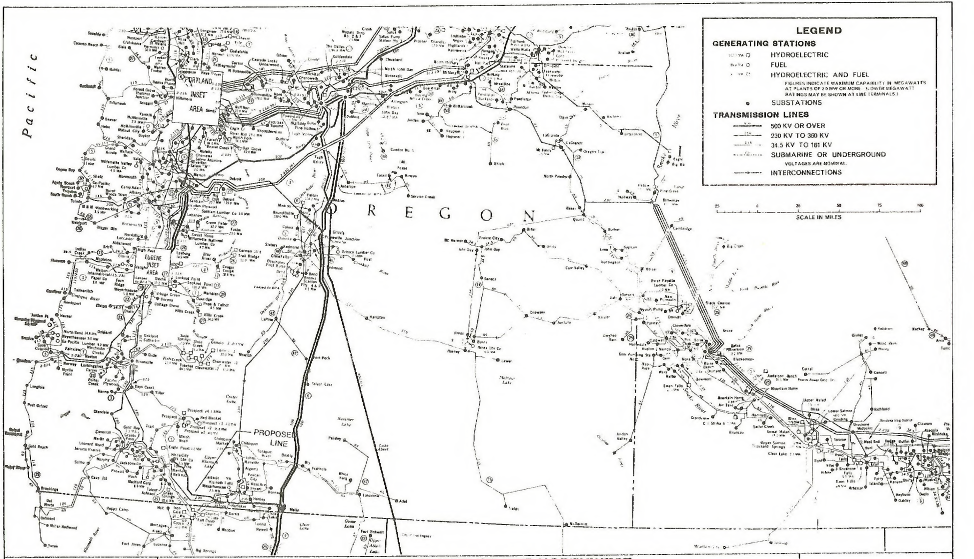
1/ Joint ownership with Idaho Power Company. Pacific's share is 50% of the output of Jim Bridger units beginning with the completion of the second unit and 66-2/3% after the completion of the third and fourth units.

Source: PP&L Environmental Assessment

The result of these growth trends is reflected in FIGURE I-4 which illustrates the total electrical load for the West Group of the Northwest Power Pool from 1965 to 1974.

The average compound energy growth rate for the period 1965-1975 was 5.37 percent compared to the national growth rate of 6.2 percent. The West Group estimates an annual growth rate of 4.9 percent from 1975-1985.

Existing generating facilities of the West Group, including hydro-electric, fossil and nuclear-fueled have a total nameplate rating of approximately 23,000 megawatts. (TABLE I-2)



TRANSMISSION GRID OF THE NORTHWEST (SW PORTION)

FIGURE I-2

Source: Bonneville Power Administration

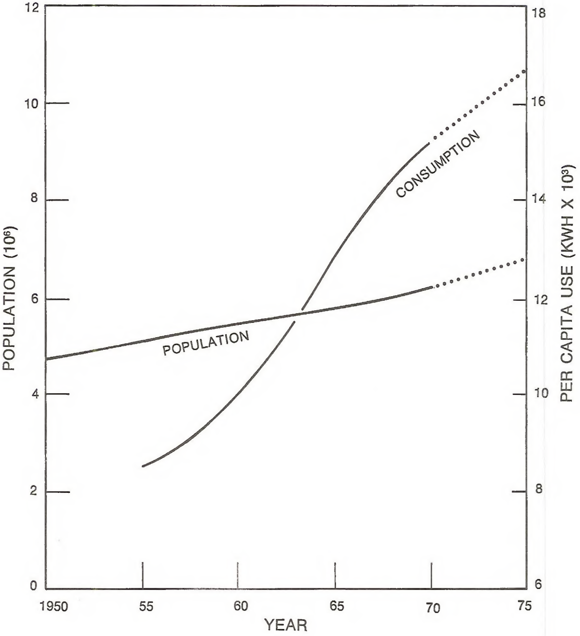


FIGURE I-3
PACIFIC NORTHWEST POPULATION GROWTH PER CAPITA
ELECTRIC ENERGY CONSUMPTION

Source: PP&L Environmental Assessment

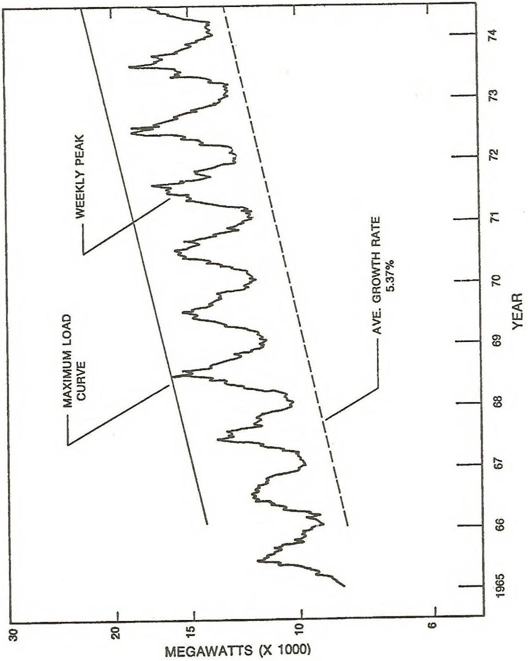


FIGURE I-4
WEST GROUP ELECTRIC LOAD 1965 - 1974

Source: PP&L Environmental Assessment

TABLE I-2

EXISTING WEST GROUP GENERATING RESOURCES

(December 31, 1974)

Utility/Agency	Hydro: No. of Plants	Hydro: Nameplate Rating mw	Thermal: No. of Plants	Thermal: Nameplate Rating mw	Total: No. of Plants	Total: Nameplate Rating mw
Bonneville Power Administration	27	11,226			27	11,226
Washington State PUD's	9	3,996			9	3,996
Pacific Power & Light Company	33	863	3	1,392[1]	36	2,255
Portland General Electric Company	8	534	6	872	14	1,406
Puget Sound Power & Light Company	6	297	4	187	10	484
The Washington Water Power Company	9	626	1	28	10	654
Eugene Water & Electric Board	4	112	1	29	5	141
Seattle City Light	6	1,190	3	52	9	1,242
Tacoma City Light	5	660	2	59	7	719
Other Small Cities	5	17	4	5	9	22
Washington Public Power Supply System	1	26	1	800	2	826
Lower Valley Power & Light, Inc.	1	2			1	2
Totals	114	19,549	25	3,424	139	22,973

Source: Pacific Northwest Utilities Conference Committee.
1. The Centralia Plant is included on Pacific's system as operator of the plant.

TABLE I-3 describes additional generating facilities now under construction or in the planning stage. These facilities will add approximately 25,000 megawatts - approximately double that now available - to the West Group system during the next ten years.

FIGURE I-5 compares West Group energy demand projections with existing and planned generating capacity. According to these projections, demand will exceed supply until 1983. By 1980 the deficit is expected to reach approximately 2000 megawatts.

The most recently published "Long Range Projection of Power Loads and Resources for Thermal Planning" published by the Pacific Northwest Utilities Conference Committee, April 16, 1976, indicates a compound annual growth rate of 4.7 percent in electric energy requirements for the period 1976-77 through 1995-96. This report is published annually and reflects latest anticipated trends in the service areas of participating utilities in the Pacific Northwest. Over the years the record of these forecasts has been good when compared with the actuals. No other organization in the region has a history of preparing reliable long-range energy-demand projections.

Pacific Power & Light Company's Wyoming generating facilities currently supply an annual average of approximately 170 megawatts of electricity to the Northwest. The amount of electricity available for transfer to the Northwest is expected to increase to approximately 1000 megawatts by 1979 (FIGURE I-6). With the addition of the Midpoint - Medford line the overall transmission capacity between Idaho and the northwest will be adequate to transfer this power.

The winter peak load in Pacific's Southwestern Division (six southern Oregon counties and three northern California counties) is about 850 megawatts in case of a mild season and about 1000 megawatts in case of a severe season. Pacific estimates that the peak load will increase to 1112 megawatts by 1977, to about 1170 megawatts by the winter of 1978-79 and to about 1290 megawatts by 1980. Pacific is presently supplying about 335 megawatts of its Southern Oregon and Northern California Division load from power generated within the area. The other 550 to 700 megawatts needed to meet the current requirements of the area are imported from other areas in the Pacific Northwest over existing transmission lines.

During 1977 the existing transmission system in Pacific's Southwest Division would be used to its maximum capability to supply the anticipated demand of 1112 megawatts. In order to supply additional electricity for needs after 1977, additional transmission would be required.

The West Group projection of a 2000 megawatt deficit in the Pacific Northwest by 1980 would preclude the sale or transfer of electricity for use in Pacific's Southwest Division.

Surplus Wyoming power transmitted over the proposed line would in general be absorbed in the Southern Oregon-Northern California load area. At times, the line would be transmitting more power than could be absorbed in Pacific's Southwestern Division and would be used elsewhere in the Pacific Northwest.

TABLE I-3

PLANNED ADDITIONS TO WEST GROUP GENERATING FACILITIES

PLANT[1]	ENERGY SOURCE	CAPABILITY EXPECTED (mw)	YEAR[2]
Thermal:			
Colstrip #1	Coal	175[3]	75-76
Colstrip #2	Coal	175[3]	75-76
Trojan	Nuclear	1130	75-76
Jim Bridger #2	Coal	500	75-76
Jim Bridger #3	Coal	500	77-78
Jim Bridger #4	Coal	333[4]	79-80
WNP #2	Nuclear	1100	79-80
Colstrip #3	Coal	490[5]	79-80
Colstrip #4	Coal	490[5]	80-81
WNP #1	Nuclear	1250	82-83
Carty	Coal	500	80-81
WNP #3	Nuclear	1240	82-83
WNP #4	Nuclear	1250	84-85
Skagit #1	Nuclear	1288	83-84
WNP #5	Nuclear	1240	84-85
Pebble Springs #1	Nuclear	1260	82-83
Skagit #2	Nuclear	1288	85-86
TOTAL THERMAL		15469	
Hydro:			
BPA[6]	Hydro	8405	75-86
Washington State PUD's	Hydro	408	77-78
The Washington Water Power Company	Hydro	125	77-78
TOTAL HYDRO		8938	
TOTAL ALL SOURCES		24407	

Source: Pacific Northwest Power Pool

1. Abbreviations are for Washington Nuclear Projects (WNP) sponsored by Wash. Public Power Supply System.
2. Probable energy dates.
3. Fifty percent of plant total.
4. Two-thirds of plant total.
5. Seventy percent of plant total.
6. Marketing agent for U.S. Corps of Engineers and Bureau of Reclamation Plants.

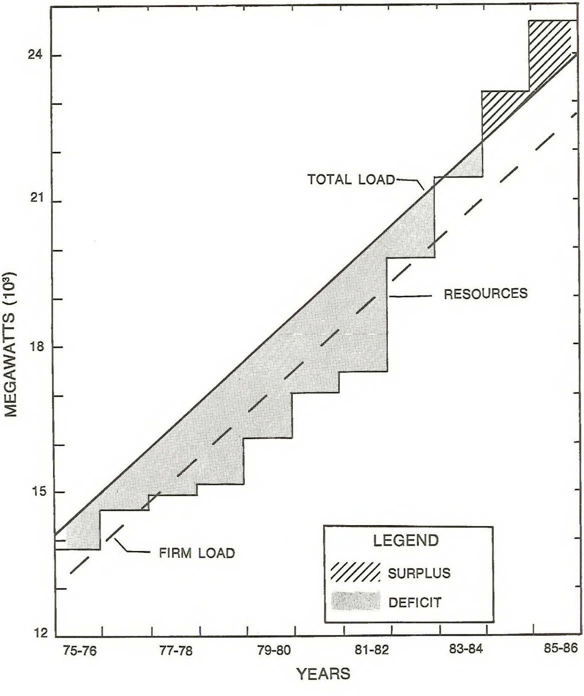
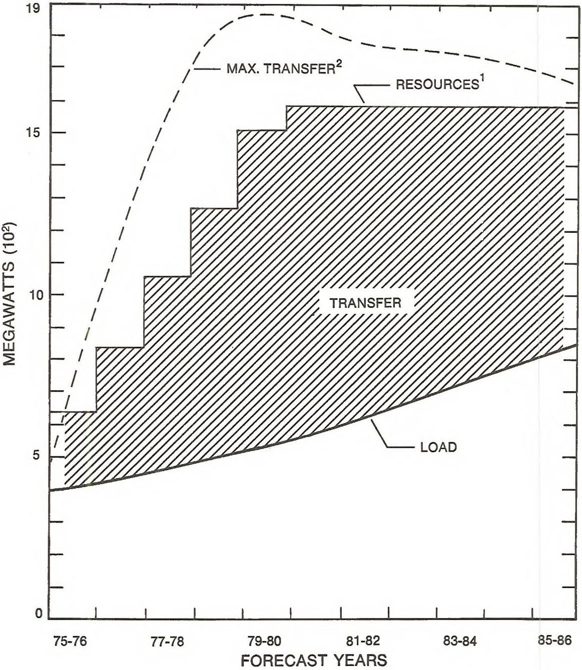


FIGURE I-5
WEST GROUP PROJECTIONS OF ENERGY DEMAND
AND GENERATING CAPACITY 1975 - 1986

Source: PP&L Environmental Assessment



1. Total resource for load (excludes maintenance).
2. Maximum energy transferable during peak production periods.

FIGURE I-6
FORECASTED AVERAGE ANNUAL USE AND AVAILABILITY OF PACIFIC POWER & LIGHT COMPANY'S WYOMING ELECTRIC POWER RESOURCES

Source: PP&L Environmental Assessment

Proposed Right-of-Way Location

Midpoint to Malin

FIGURE I-1 shows the general location of the approximately 391-milelong Midpoint, Idaho to Malin, Oregon portion of the proposed transmission line. The specific location is shown on Maps A and B in the Appendix of the Draft Statement.

The Midpoint to Malin segment would originate at the Midpoint, Idaho substation located approximately 20 miles north of Twin Falls. For about 25 miles west it would parallel an existing Idaho Power Company 230 KV transmission line to the Snake River just north of Hagerman, Idaho.

It would cross the Snake River approximately 1/4 mile upstream from Lower Salmon Falls Dam and angle generally west, passing between the Bruneau Dunes State Park and the Saylor Creek Air Force Gunnery Range to the Bruneau River Valley.

After crossing the Bruneau Valley, the proposed route would continue west across Owyhee County passing just north of Spencer Reservoir and through the Owyhee Mountains between North and South Mountains to the Idaho-Oregon border about ten miles south of Jordan Valley, Oregon.

From the state line the proposed route would bend to the southwest, passing south of Antelope Reservoir to an Owyhee River crossing approximately 2 miles upstream from the community of Rome, Oregon.

Angling more sharply southwest, it would cross U.S. Highway 95 approximately four miles northwest of the Federal Aviation Administration's Rome VOR and emergency landing strip.

Continuing southwesterly the proposed route would cross the southern end of the Alvord Desert, intersecting and paralleling an existing 115 KV power line, and pass about two miles north of Fields, Oregon. It would continue to parallel the existing power line between the Steens and Pueblo Mountains, via Long Hollow, to the southern end of Catlow Valley.

After crossing Catlow Valley, the proposed route would angle westerly, passing south of Beatys Butte to a Warner Valley crossing between Crump and Hart Lakes.

After climbing out of Warner Valley over the extreme north end of Fish Creek Rim, the proposed route would turn southwest, crossing the Bonneville Power Administration 750 KV DC transmission line and the Lake County road to Plush before turning west to generally parallel Oregon State Highway 140 to Goose Lake Valley just north of Lakeview, Oregon.

After crossing Goose Lake Valley, the proposed route would turn due south and run along the western edge of the valley almost to the Oregon-California border. There it would turn west and parallel the border to the Malin Substation located approximately 21 miles southeast of Klamath Falls, Oregon.

Malin to Medford

FIGURE I-7, Malin to Medford, shows the general location of the approximate 92-mile-long Malin to Medford portion of the proposed right-of-way. Map B in the Appendix of the Draft Statement shows the specific location.

From the Malin Substation the proposed route would parallel an existing 230 KV power line for about nine miles northwesterly, then turn west crossing the Burlington Northern Railroad, Oregon State Highway 39 and the Southern Pacific Railroad just southwest of Stukel Mountain.

Continuing west, the proposed route would cross the southern part of the Klamath Hills, the Klamath Basin, and U.S. Highway 97 north of Worden, Oregon. It would pass south of Hamaker Mountain and Chicken Hill, and cross the Klamath River approximately two miles north of the Oregon-California border where it would meet an existing 230 KV power line owned by Pacific.

The proposed route would parallel the existing 230 KV line right-of-way west-to-northwest to a point near the Green Springs Highway (Oregon State Highway 66). Leaving the existing power line right-of-way, it would continue northwesterly to the head of Antelope Creek and follow down the west side of Antelope Creek Valley to the proposed substation site north of Roxy Anne Peak, approximately 5 miles northeast of Medford, Oregon.

Proposed Construction Activities

Transmission line construction generally follows a sequence of right-of-way clearing, road construction, tower foundation construction, tower assembly and erection, conductor and shield wire stringing and tensioning and finally, site restoration.

TABLE I-4 contains the approximate land area that would be required by the proposed Midpoint to Medford 500 KV transmission line right-of-way.

Right-of-Way Clearing

Pacific states that right-of-way clearing would be conducted pursuant to its Right-of-Way Management Policy (Appendix F of Pacific's Environmental Assessment for Proposed 500 KV Transmission Project, Malin, Oregon to Midpoint, Idaho) and would be restricted to the minimum

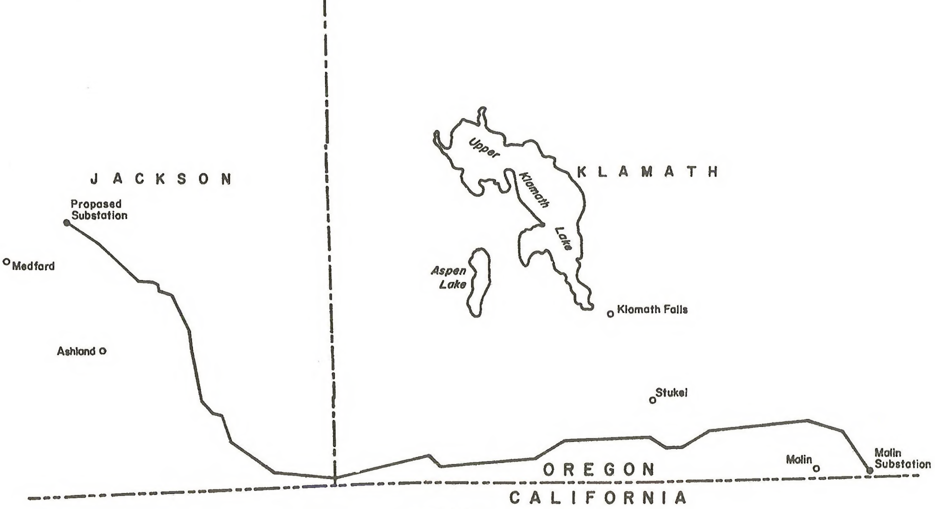


FIGURE I-7

—— General Location Proposed Route, Malin-Medford

TABLE I-4

LAND AREA REQUIRED FOR 175-FOOT-WIDE
483 MILE LONG TRANSMISSION RIGHT-OF-WAY

		Acres					
	Miles	BLM	USFS	State of Idaho	State of Oregon	Other	Total
Midpoint to Malin	391	5345	361	117	244	2227	8,294
Malin to Medford	92	510	---	---	---	1442	1,952
Total	483	5855	361	117	244	3669	10,246

necessary for safe construction and operation of the transmission line. In timbered areas only those trees would be removed that are necessary for construction or which are tall enough to endanger or interfere with the conductors. Additional trees would be removed for access road purposes. Clearing would be accomplished by crews using chainsaws and skidders. Any merchantable timber removed would be stacked along the edge of the right-of-way so that it could be transported to processing plants.

Between Midpoint and Malin 15.5 miles of forest land would be crossed. Based upon 100% clearing of the 175-foot-wide proposed right-of-way, 329 acres would be cleared. Between Malin and Medford 47 miles of forest land would be crossed and 997 acres cleared, based on 100% clearing.

Contemporary right-of-way clearing practices in forest areas leave far more vegetation intact than in previous years. This would include most of the trees within the proposed right-of-way.

In non-forested areas clearing would be accomplished by crews using tractors and graders and the clearing limited to temporary access roads, tower sites and pulling sites.

Access Roads

Construction of new roads, or upgrading of existing roads, to a 14-foot width would be required the length of the proposed 483 mile-long proposed Midpoint to Medford transmission line right-of-way. Pacific states that all roads would be temporary and constructed to Pacific's specifications based on land management agency, state or private landowner requirements.

TABLE I-5 shows the maximum estimated miles of temporary access roads, including stub roads that may have to be built to tower sites, that would be required and the approximate number of acres that would be disturbed. The figures are based on 1.2 miles of a 14 foot wide access road constructed per mile of right-of-way. (1.2 miles of temporary road per mile of right-of-way x 483 miles x 5280 feet per mile x 14 foot wide road: 43560 square feet per acre = 983 acres.)

TABLE I-5

ACCESS ROAD REQUIREMENTS FOR 483-MILE-LONG 500 KV TRANSMISSION ROW

(1.2 MILES ACCESS ROAD PER MILE OF TRANSMISSION LINE R/W)

Segment	Road Width	Miles of R/W	Miles of Temporary Road	Acres Disturbed
Midpoint-Malin	14 feet	391	469	796
MalinMedford	14 feet	92	110	187
Total		483	579	983

An 11-month time period is estimated by Pacific for combined right-of-way clearing and access road construction, using a work force of about 38 men.

Towers and Foundations

Pacific proposes to use free-standing, four legged, galvanized steel towers. Individual tower design would depend on specific requirements at each tower site. These requirements would not be determined until the final project design stage. However, Pacific states that a typical tangent tower would be 120 feet in height and have a base area of 22 feet by 29 feet. A typical angle tower, estimated by Pacific to comprise 4.8 percent of the total number of towers, would have a base area of 33 feet by 33 feet. Average area occupied by each tower amounts to about .015 acre, which would be the total area cleared for each tower base.

FIGURES I-8 and I-9 depict typical tangent and angle towers.

Distance between towers would be primarily governed by the nature of the terrain. Pacific proposes to use approximately 4.32 towers per mile, which would average approximately one tower every 1,222 feet.

TABLE I-6 shows the estimated number of towers required for the proposed Midpoint-Malin-Medford transmission line and the land area occupied.

TABLE I-6

ESTIMATED NUMBER OF TOWERS AND LAND OCCUPIED WITHIN 483-MILE-LONG ROW

Segment	Miles	Towers Per Mile	Towers	Land Occupied
Midpoint-Malin	391	4.32	1,689	25 Acres
Malin-Medford	92	4.32	398	6 Acres
Total	483		2,087	31 Acres

At an average weight of 17,000 pounds per typical tower approximately 37 tons of steel would be required for each mile of the proposed Midpoint to Medford 500 KV transmission line.

Under average soil conditions, Pacific proposes to use grillage-type foundations. These are rectangular steel lattice structures comprised of a series of interconnected angles or channels. (FIGURE I-10)

One foundation is required for each tower leg. Each would be placed in a 10-foot x 10-foot x 8-foot deep hole excavated by backhoe, set to elevation, backfilled with excavated material and compacted. Excess excavated soil would be evenly spread in the immediate vicinity. Prior to tower erection, only the tower leg connection point would be visible above the ground. TABLE I-7 depicts the estimated number of footings required and amount of soil disturbance that would occur based upon grillage-type footings.

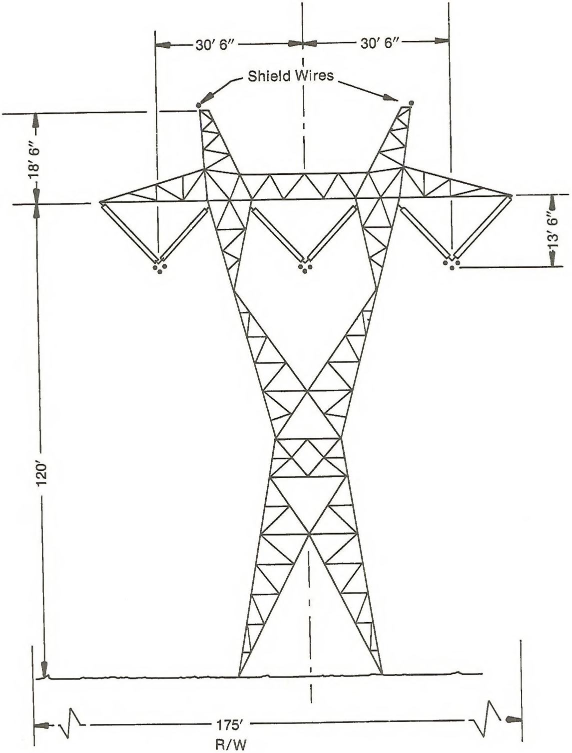


FIGURE I-8
TYPICAL TANGENT TOWER - Base Dimention 22'X29'
Source: PP&L

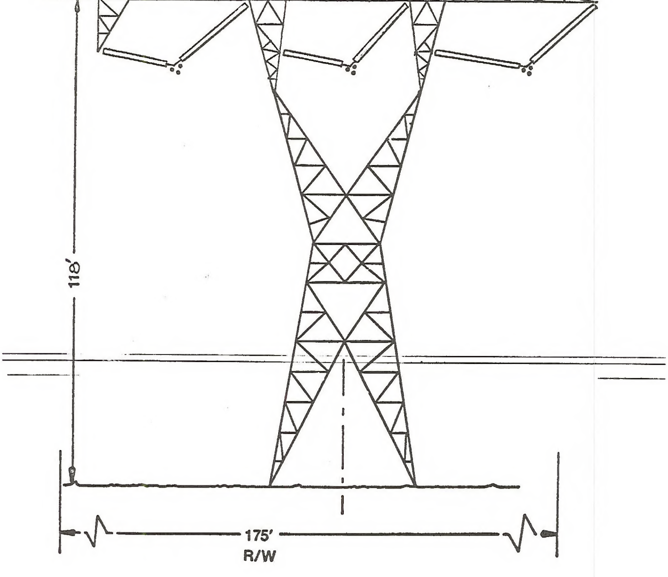


FIGURE I-9
TYPICAL ANGLE TOWER - Base Dimention 33'X33'

Source: PP&L

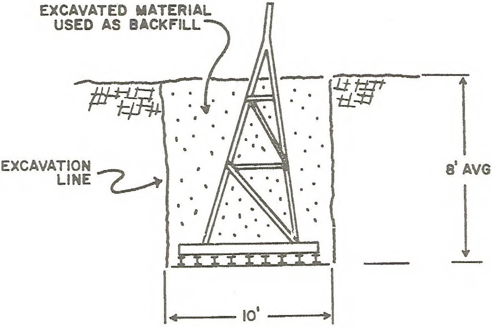


FIGURE I-10
STEEL GRILLAGE FOUNDATION

TABLE I-7

ESTIMATED NUMBER OF TOWER FOOTINGS AND ASSOCIATED SOIL DISTURBANCE

Segment	Miles	Towers	Footings	Soil Disturbed
Midpoint-Malin	391	1,689	6,756	8 Acres
Malin-Medford	92	398	1,592	2 Acres
Total	483	2,087	8,348	10 Acres

This acreage is the area disturbed in addition to that already accounted for in clearing for tower sites.

Cast-in-place concrete footings (FIGURE I-11) are proposed for use in soil areas unsuitable for grillage type footings. These would be identified in the final project design stage. One footing would be required for each tower leg.

A backhoe would be used to excavate the hole, typically 6 feet x 6 feet x 12 feet deep. Following installation of a 25 foot square form, a reinforcing steel cage with the tower leg connection at the top would be inserted inside the form and set to elevation with a crane. Concrete placement follows, about 10 cubic yards per tower. After removal of the form the area around the concrete footing would be backfilled with excavated material and compacted. Excess excavated soil would be evenly distributed in the immediate area. Prior to tower erection, only the tower leg connection would be visible above ground.

According to Pacific, concrete for footings would be obtained from commercial ready-mix plants in the vicinity of the construction site. If temporary concrete batch plants would be necessary they would be located at staging areas in Boise, Lakeview, Klamath Falls and Medford. Aggregate and water would be obtained from local commercial sources. Concrete would be delivered to tower sites by truck or helicopter.

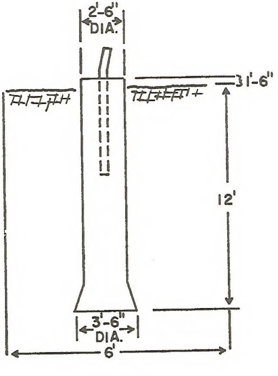


FIGURE I-11
CONCRETE FOUNDATION

Source: PP&L

In areas of extremely unstable soil conditions, such as portions of the Klamath Basin, driven pile footings may be required. They would be installed by a pile driver. After installation, only the top of the pile would be visible above ground.

The majority of tower footings for the proposed route would probably be grillage-type. The number of cast-in-place concrete and driven-pile footings that may be required cannot be estimated at this time.

Foundation crews would normally consist of about 35 men, completing about 15 miles per month.

Tower Assembly and Erection

Tower assembly follows foundation construction. Typically, tower components are assembled in staging areas and moved by truck or helicopter to the work site. Assembly can also be accomplished at the tower site within the right-of-way. The time required to assemble and erect a tower averages three days depending on the type and amount of metal. A mobile crane is often used to assist the assembly and erection crew, which normally consists of about seven men.

Upon completion of tower assembly, erection commences. This operation generally employs the use of a rubber tire or track mounted crane from 35 to 100 tons in size; however, some contractors utilize large work helicopters in lieu of a crane.

After each tower is erected, insulators would be attached in a "V" configuration. Each "V" would consist of 50 insulators, 25 to a side, weighing approximately 250 pounds. Insulators would be composed of greenish cast toughened glass and cast steel.

Wire Stringing and Tensioning

Conductors and shield wires would be strung under tension. An average of three miles would be strung and tensioned at one pull. Required equipment would include tensioner at the beginning of the pull and pulling equipment on the other end.

According to Pacific, pulling equipment would require a level, graded pad approximately 20 x 40 feet. TABLE I-8 shows the approximate amount of land that would be disturbed for pulling equipment pads along the proposed Midpoint to Medford transmission line route.

TABLE I-8

ESTIMATED LAND REQUIREMENTS

FOR CONDUCTOR AND SHIELD WIRE PULLING EQUIPMENT PADS

Segment	Miles	Pulling Pads	Land Required
Midpoint-Malin	391	130	3 Acres
Malin-Medford	92	31	1 Acre
Total	483	161	4 Acres

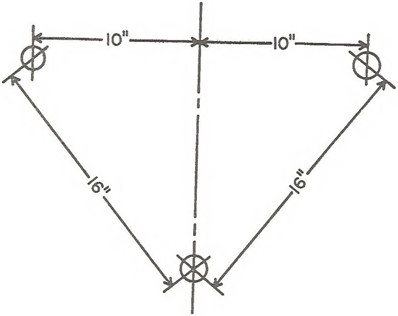
Conductor and shield wire reels would be stored in the staging areas and hauled by truck to pulling sites. Stringing and tensioning would be accomplished by first pulling a light line through each tower between the tensioner and pulling equipment. This line would be used to pull a heavier pulling cable from the tensioner site to the pulling equipment. Each conductor and shield wire would be attached to the pulling cable, pulled into position, tensioned and attached to the insulators.

The proposed transmission line would be a single-circuit, three phase (conductor bundle) alternating current line. Spacing between phases would be 30.5 feet. Each phase would consist of a three conductor bundle, FIGURE I-12. Conductors would be stranded aluminum around a single steel wire core. Diameter of each conductor would be 1.316 inches, weighing 1.288 pounds per foot.

The three conductors of each phase would be 1272 MCM ACSR (Million Circular Mills aluminum Conductor Steel Reinforced) with a triangular configuration as shown in FIGURE I-12. The conductors of each bundle would be separated by spacers at intervals between towers.

Two 3/8 inch EHS galvanized steel shield wires would be installed at the peaks of each tower to intercept and transmit current from lightning strikes to the towers and into the ground.

Approximately 33 tons of conductor and shield wire material would be required for each mile of transmission line. TABLE I-9 contains the estimated tons of tower, conductor and shield wire and insulator material required for the proposed Midpoint to Medford 500 KV transmission line.



CONDUCTOR

1272 MCM ACSR 36/1 "Skylark"
1.316" Diameter
1.288 lbs/ft bare weight

FIGURE I-12
CONDUCTOR CONFIGURATION

Source: PP&L

TABLE I-9

ESTIMATED REQUIRED QUANTITIES

OF TOWER, CONDUCTOR, SHIELD WIRE AND INSULATOR MATERIAL

Segment	Miles	Tower Material	Conductor and Shield Wire Material	Insulator Material
Midpoint-Malin	391	14,467 Tons	12,903 Tons	633 Tons
Malin-Medford	92	3,404 Tons	3,036 Tons	149 Tons
Total	483	17,871 Tons	15,939 Tons	782 Tons

Source: PP&L Environmental assessment

According to Pacific, clearances between the conducting wires and the ground would equal or exceed those specified in the National Electric Safety Code, Sixth Edition.

Minimum conductor-to-ground clearance would be 38 feet. It would be increased to 45 feet across highways; 42 feet over cultivated lands; and 55 feet above railroad tracks.

A work force of about 45 men would be required to string, tension, and attach the conductors to the insulators. Shield wires would be attached at the same time. About 15 miles of line would be completed per month by a single crew.

Sub and Reactor Stations

Midpoint Substation

Pacific's proposed 500 KV transmission line would require expanding Idaho Power Company's existing Midpoint, Idaho substation. (Figure I-13). The new facilities would occupy approximately ten acres within the existing area owned by Idaho Power Company. All material would be delivered to the site.

A work force of about 20 men would be required for expansion of the substation, which would be completed during a period of about 11 months. Construction equipment would include bulldozers, grader, backhoe, digger, compactor, 12 ton and 25 ton crane and high reach (bucket) rig. Site

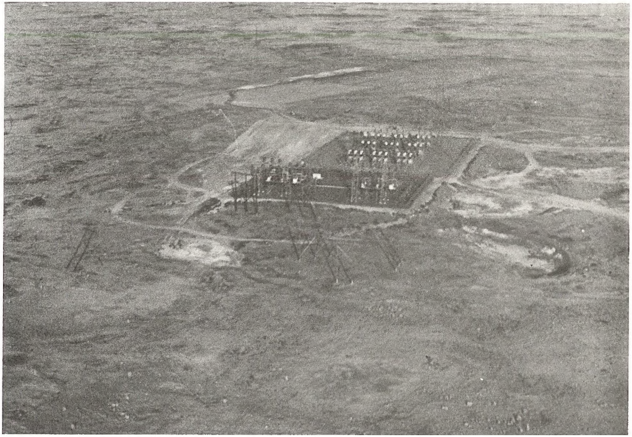


FIGURE I - 13
Midpoint Substation

preparation and equipment foundation would be put in, followed by installation of towers and supports, placement of transformers, buswork and control systems and other electrical apparatus.

Fields Reactor Station

The proposed transmission line would also require a reactor compensation station about midway between the Midpoint and Malin substations. The purpose of this facility would be to maintain constant voltage in the power line. According to Pacific, it would be located about one mile north of Fields, Oregon and would occupy five acres, centered on the proposed right-ofway. Construction would be completed during a seven month work period by a work force of eight men. Construction equipment would be similar to that used to expand the Midpoint substation. Sequence of work would also be the same.

Malin Substation

The Malin Substation (Figure I-14) would also have to be expanded to accommodate the proposed transmission line. The expansion would occupy nine acres and be completed during an 11-month period by a work force of about 15 men. Construction equipment and sequence would be similar to that for the Midpoint substation expansion.

Medford Substation

The proposed 500 KV line would also require constructing a new substation in the Table Rock area north of Medford, Oregon. The proposed facility would require approximately 12 acres and would be located on private land to be purchased by Pacific.

It would require a construction force of about 20 for an eight-month period. Required construction equipment and construction sequence would be similar to that for the Midpoint Substation expansion.

Staging Areas

Pacific states that leased staging areas would probably be established at Mountain Home, Idaho, Lakeview, Klamath Falls and Medford, Oregon.

Exact locations and size have not been determined. However, Pacific states that they would be located in present industrial areas adjacent to railroads, when possible. Material would be shipped to these locations and stored. Individual towers could be shipped in bundles, preassembled and transported to individual sites by truck or helicopter. Conductor (wire), and shield wire reels would be stored in the same areas and hauled by truck to pulling sites when that phase of the construction operation would be required. If necessary, temporary concrete batch plants would also be set up at the staging areas and concrete delivered on site by large mix trucks or helicopter. Gravel and water for use in mixing the concrete would be obtained from local commercial sources.

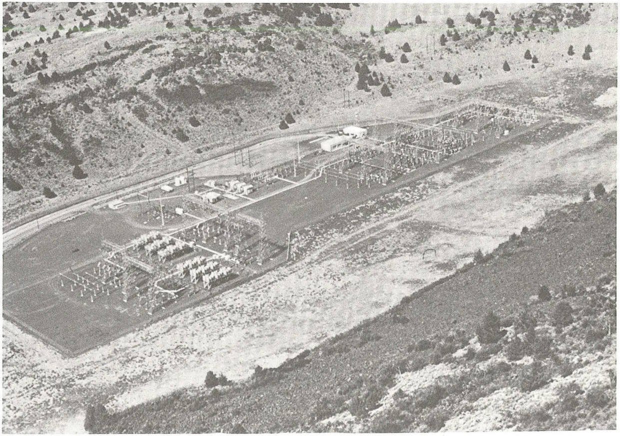


FIGURE I - 14
Malin Substation

Post Construction

Pacific states that it would rehabilitate all areas disturbed during the construction sequence. Topsoil would be reshaped, roads water barred and all areas reseeded. Rehabilitation measures would be accomplished in accordance with Pacific's committed mitigating measures (Chapter IV) and also with stipulations set forth by the landowner, whether federal, state or private. This would be completed by a work force of about ten men, completing about 50 miles per month.

Ground and/or aerial inspection of the proposed power line would be done every six to 12 months. If ground inspection is done, Pacific states that it would maintain the temporary access construction roads with sod cover, water bars and proper slope so as to prevent erosion and still allow access for four-wheel drive vehicles. Because of the length of the proposed Midpoint to Medford transmission line (483 miles), Pacific has stated that surveillance would probably be done by aerial means under contract.

As a part of surveillance and maintenance, no new or additional communications system is proposed. Existing telephone and radio systems would be utilized.

Upon completion of the proposed transmission line, Pacific states that seven additional permanent personnel would be required to man the substations and for routine surveillance and maintenance work.

INTERRELATIONSHIPS

Existing

Table I-1 describes Pacific's Wyoming generating facilities which would provide the electric energy to be transmitted over the proposed Midpoint-Malin-Medford 500 KV transmission line.

Northwest Grid System

The Northwest Grid System is shown on the Western Systems Coordinating Council Map in the Appendix of the Draft Statement.

There is insufficient capacity in existing facilities between Idaho and the Northwest, as they are at full capacity, to allow Pacific to transfer its excess Wyoming power. It could be possible to replace existing transmission lines with high capacity lines to provide the needed transmission capacity. This would, however, require that several utilities be involved in any transmission line upgrading. Construction of additional line(s) parallel to existing east-west rights-of-way to provide a comparable alternative to the Midpoint-Malin-Medford proposal would require the development of new rights-of-way of a considerably greater distance to reach southern Oregon load centers. Higher transmission losses would occur because of the greater distance.

Known Projects

On April 29, 1975 Idaho Power Company applied for a Federal Power Commission license to upgrade two existing 230 KV transmission lines between the Borah (substation near American Falls, Idaho) and Midpoint, Idaho substations to 345 KV capacity. No new construction or right-of-way would be required. Upgrading would consist of repositioning and increasing the number of insulators and repositioning and retensioning conductors (wires).

According to Idaho Power Company an additional 110-mile-long 345 KV line from the company's Kinport, Idaho Substation to the Midpoint, Idaho Substation will be required by 1979.

The upgrading and new line would complete the transmission system required to transfer Idaho Power's and Pacific's Wyoming power resources to the Midpoint Substation. There, Idaho Power's share would be diverted into the company's transmission network and Pacific's share would be transferred to west coast markets via the proposed Midpoint-Medford 500 KV line.

Potential Projects

Generating Plant

On November 8, 1974, Idaho Power Company applied to the Idaho Public Utility Commission for a Certificate of Convenience and Necessity to construct and operate two 500 megawatt coal-fired steam turbine generating units and support facilities (Pioneer I and II in southern Idaho. Pioneer I is scheduled to go into service in 1981; Pioneer II in 1983. Two additional 500 mw units could be added at some as-yet-unknown time in the future.

The proposed site is approximately 24 miles southeast of Boise near Orchard in Ada County (Section 30, T. 1 S., R. 3 E., BM). It is approximately 33 miles north of Pacific's proposed 500 KV transmission line route.

This application was rejected by the Idaho Public Utilities Commission.

Other Facilities

There is much discussion, and no doubt, some tentative plan to construct additional generating facilities in eastern Idaho and the vast coal fields to the east in Wyoming, Montana and northern Colorado. Several potential generating centers are schematically depicted on the January, 1976 Western Systems Coordinating Council Map included in the Appendix of the Draft Statement as Map C.

If additional facilities are constructed in these areas, some of the power would likely be transmitted to west coast markets. Any new transmission facilities would logically follow the direct east-west transmission corridor that would be established by Pacific's proposed 500 KV Midpoint-Medford transmission route or any alternative route.

Geothermal Development

Vast areas of private, state and federal lands within the general area that would be crossed by Pacific's proposed 500 KV line have been leased or have leases pending for potential development of geothermal resources.

Several promising geothermal sites are being explored. Much exploration, research and development will be required to identify and quantify their electric power generating potential. These resources may ultimately be capable of partially mitigating predicted shortfalls in regional electric power baseloads.

Where located in reasonably close proximity to population centers, even low-grade (temperature) geothermal resources may be employed in residential, commercial and industrial space heating, thereby further reducing demands on conventional generating facilities.

If these geothermal resources ultimately yield commercial quantities of electric power, it is possible they could be tied into Pacific's proposed Midpoint-Medford transmission line.

Proposed Projects

Sierra Pacific Power Company and Idaho Power Company propose to construct approximately 368 miles of 230 KV transmission line between the Hunt substation, east of Twin Falls, Idaho and the Tracy generating station about 18 miles east of Reno, Nevada. Idaho Power Company is to construct that portion of the line from the Hunt substation to the Idaho-Nevada border and Sierra Pacific Power Company is to construct the line through Nevada to the Tracy station. The proposed transmission line is required by Sierra Pacific in order to satisfy its obligations to provide firm power supply for its customer power demands in its service territory. The power required by Sierra Pacific, and to be transmitted over the proposed 230 KV transmission line, is to be purchased from Utah Power and Light Company-excess power generated at its Utah system coal-fired plants.

The power would go north out of Utah over existing Utah Power Company transmission lines to the American Falls, Idaho area, then west over existing Idaho Power Company lines to the Hunt substation and then into Nevada over the proposed Hunt-Tracy 230 KV line.

There is no direct relationship between Sierra Pacific's proposal and Pacific's 500 KV proposal as entirely different market areas are to be served. However, there could be an indirect relationship as an Idaho Power Company 230 KV line connects the Midpoint substation with the Hunt substation. Therefore, some of the power to be purchased by Sierra Pacific could possibly be transmitted over the Idaho Power system between American Falls and the Midpoint substation and then on to the Hunt substation.

The possibility of the proposed Hunt-Tracy 230 KV transmission line serving as an alternative to Pacific's 500 KV proposal is not considered to be feasible because Sierra Pacific has a shown demand for all of the power that the proposed 230 KV transmission line can carry; a single 230 KV transmission line (or a single 500 KV line) is not capable of carrying the amount of energy required by Sierra Pacific and also Pacific's excess Wyoming energy; Sierra Pacific's proposed line ends at Tracy, Nevada which is not near any north-south transmission intertie.

Further information can be found in the 230 KV Intertie Tracy-Hunt Environmental Analysis, April, 1975.

ASSUMPTIONS AND ANALYSIS GUIDELINES

For purposes of analyzing impacts of the proposed transmission line, short term impacts are defined as those occurring from beginning of construction through land surface rehabilitation. Long-term effects and impacts are those occurring after land rehabilitation is completed.

No additional high voltage transmission lines are planned for construction by Pacific through the study area during the next 20 years. If the proposed line should be constructed, and also a second line at some future date, a transmission corridor would be established.

For analysis purposes, and because of Union jurisdictions involved, it is assumed that two separate contracts would be let by Pacific. Individual crews are assumed to start at the Malheur-Harney County line (Union jurisdictional boundary) and work east and west.

Construction of the proposed Midpoint-Malin-Medford transmission line is estimated to take 21 months. Due to the job sequences and various work progress rates, the peak employment for transmission line construction is estimated to be 295 people. It is estimated that each of the two transmission line contractors would operate a 38-man clearing and road construction crew (4 to 6 months work), a 35-man foundation crew (14 to 17 months work), an average of seven 7-man tower assembly crews (17 months work), a 45-man stringing crew (14 to 19 months work), and a 10-man rehabilitation crew (4 to 6 months work). It is estimated that construction on the Fields Reactor Station (8 men working 7 months), and expansion of the Midpoint (20 men working 11 months) and Malin (15 men working 11 months) substations would occur concurrently and provide for a peak employment of 43 people on substation construction.

A three to eight year period is estimated for natural revegetation of disturbed areas, depending on precipitation, length of growing season and soil type. An average of six years would be generally applicable to the entire proposed route. The time span would be least in the higher precipitation western portion of the proposed route and longest in the drier desert areas.

Tables I-10, 11 and 12 were developed to establish parameters and guidelines for analysis of impacts of the proposed transmission line.

TABLE I-10

SUMMARY OF AREAS ALTERED BY CONSTRUCTION

Right-of-way Clearing - confierous forest type - 175 foot wide right-of-way.	Miles	Acres
Midpoint to Malin		
100% cleared	15.5	329
60% cleared	15.5	197
20% cleared	15.5	66
Malin to Medford		
100% cleared	47.0	997
60% cleared	47.0	598
20% cleared	47.0	199

Access Roads - 14 foot wide road.	Miles	Acres Disturbed
Midpoint to Malin	469	796
Malin to Medford	110	187
Total	579	983

Number of Towers and Area Occupied.	Number	Acres
Midpoint to Malin	1,689	25
Malin to Medford	398	6
Total	2,087	31

Pulling and Tensioning Pads	Number	Acres
20 foot x 40 foot pads		
Midpoint to Malin	130	3
Malin to Medford	31	1
Total	161	4

Estimated Amount of Steel Used - Tons	Towers	Conductor and Shield Wire	Total
Midpoint to Malin	14,467	12,903	27,370
Malin to Medford	3,404	3,036	6,440
Total	17,871	15,939	33,810

Estimated Amount of Insulators - Tons	
Midpoint to Malin	633
Malin to Medford	149
Total Tons	782

TABLE I-11

ACRES REQUIRED IN R/W - 175 FEET WIDE

Route Segment	Acres
Midpoint to Malin	8,294
Malin to Medford	1,952
Total	10,246

TABLE I-12

ACRES REQUIRED FOR PROPOSED SUB

AND REACTOR STATIONS

	Acres
Midpoint substation expansion	10
Fields Reactor station	5
Malin substation expansion	9
Medford substation	12
Total	36

CHAPTER II

DESCRIPTION OF THE ENVIRONMENT

For analysis purposes the Midpoint to Malin portion of the proposed powerline was divided into four segments (FIGURE II-1) and the Malin to Medford portion into four segments (FIGURE II-2).

CLIMATE

Midpoint to Malin

The climate in southern Idaho and southeastern Oregon along the proposed right-of-way is characterized by wide ranges in temperature, relatively low precipitation, mostly sunny days, low humidity, high rate of evaporation and occasional severe winter storms.

The southern Idaho area has dry, hot summers and relatively mild winters. The area in southeast Oregon west of the Owyhee Mountains on to Malin has a semi-arid climate with short summers and relatively long, severe winters.

Precipitation in the southern Idaho area ranges from about 9 inches or less near Midpoint to about 7 inches in the Bruneau River Valley and up to 23 inches in the higher elevations of the Owyhee Mountains.

There is a pronounced reduction in average monthly precipitation during July and August throughout the Midpoint to Malin area. During these two months most of the lower valleys receive less than 0.25 inches of precipitation per month. In winter and spring, monthly precipitation averages between 1 and 1.5 inches at lower elevations and 2.0 to 4.0 inches or more at higher levels.

Snowfall varies widely throughout the area. Lower valleys and plateaus often have only intermittent snow cover during the winter. Mountain stations at higher elevations (6,400 feet) in the Owyhee Mountains average from 30 to nearly 45 inches per year.

Southeastern Oregon has a winter precipitation pattern, with about 55 percent of the annual total occurring from November through March. Average annual precipitation varies from about 6 inches at Rome to a high of 15 inches at Lakeview and 12 inches at Malin.

TABLE 1 (Appendix A) shows precipitation data for selected stations in the general area that would be traversed by Pacific's proposed transmission line. FIGURE 1 (Appendix A) shows mean annual precipitation in the same area.

Temperatures vary considerably throughout the southern Idaho area that would be crossed by the proposed right-of-way. Nearly all lower elevation stations have recorded summer temperatures in excess of 110°F. and winter temperatures as low as -20° to -30°F. Mean annual temperatures in the lower valley areas average about 50° to 52°F., and 38° to 40°F. in the higher elevations in the Owyhee Mountains. Length of growing season ranges from 140 to 150 days at lower elevations to about 60 days in the mountains.

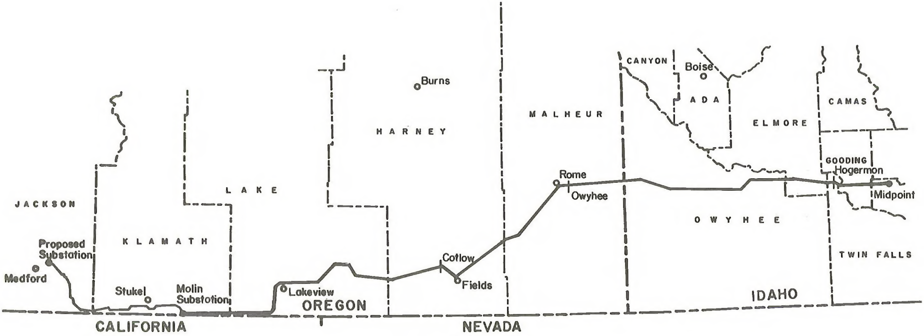


FIGURE II-1
Segments, Midpoints-Malin, Proposed Route

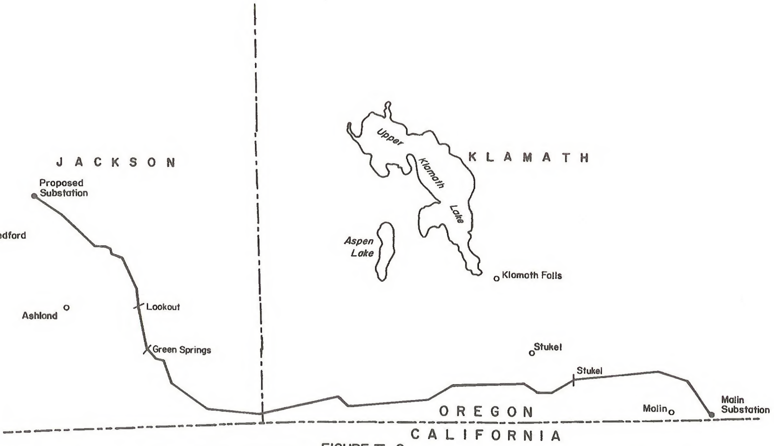


FIGURE II-2
Segments, Malin-Medford, Proposed Route

In the southeastern Oregon area, average maximum temperatures during the summer months are in the upper 80's on the plateau floors. It is not uncommon for temperatures to exceed 100^{O}F. in some areas during the summer. Night temperatures are comparatively cool.

Subfreezing temperatures occur an average of 175 to 275 days annually, depending on elevation. Subfreezing temperatures may be expected during any month of the year. Average maximum winter temperatures range from the upper 30's to lower 50's, average minimum temperatures range from 15^{O} to 25^{O}F.

Below zero temperatures occur nearly every winter throughout the area. Coldest weather occurs when cold arctic air, which usually moves southward from Canada along the east slope of the Continental Divide, breaks across the Rocky Mountains and moves southward between the Rocky Mountains and the Cascade Mountain Range. Growing seasons range from 80 to 140 days at lower elevations.

TABLE 2 (Appendix A) contains average temperatures and departures from normal for selected stations in the general area that would be traversed by Pacific's proposed right-of-way.

No wind data are available for points along the proposed transmission line route. The closest available records are from the Boise, Idaho Municipal Airport and Mountain Home, Idaho U.S. Air Force Base.

On an annual basis, the wind at the Boise Municipal Airport is from the east/southeast to south/southeast 38 percent of the time, with an average speed of 10.4 miles per hour. The wind is from the west/northwest 34 percent of the time with an average speed of 9 miles per hour.

At the Mountain Home Air Force Base the winds are from east/southeast 28 percent of the time, with an average speed of 9.5 miles per hour, and from the west/northwest 33 percent of the time with an average speed of 10.8 miles per hour. Southeasterly winds are predominant in the winter and northwesterly winds in the summer at both stations.

Prevailing winds are north or northwest in the high desert area of Oregon along the proposed route. During periods of winter storms, the more extreme winds are most frequently from the south or southwest.

Malin to Medford

The climatic conditions of southern Oregon along the proposed route are characterized by (1) wide range in temperature, (2) considerable variability in precipitation, (3) differences in snow depth at higher elevation and (4) occasional winter storms throughout the region. Climate in general is moderate with dry, warm summers and cold moist winters west of the Cascade Range and dryer conditions easterly. These variations are principally attributed to the wide range in topographic relief from Medford to Malin, Oregon.

This is partly the result of moist oceanic air masses passing inland across the Klamath and Cascade Mountain ranges whereby considerable precipitation is released on the western slopes creating the dry, orographic effect along the eastern slopes and valleys.

Like most of the Pacific Northwest, the area east of the Cascades has a definite winter precipitation pattern, with about 55 percent of the annual total occurring during the months of November through March, and about 15 percent occurring during the summer months of June, July, and August. The average annual precipitation ranges from about 7 inches in the drier areas to more than 10 inches in the higher elevations. For most of the region, however, the average annual precipitation is less than 9 inches. Annual extremes have ranged from less than 7 inches to as high as 12 inches. TABLE 3 (Appendix A) shows precipitation data from selected stations along the proposed route.

Winter precipitation occurs as snow over most of the area; at higher elevations about 65 percent of the annual total occurs as snow. Density of the snowpack increases from approximately 25 percent water equivalent in early winter to about 40 percent in April.

The mountainous areas are slightly south of the main path for winter storms and this, combined with the drying out of air masses crossing the Coast Range, results in rainfall which is only a fraction of that experienced in the coastal regions. Totals range from 20 to 35 inches on valley floors and gradually increase to nearly 100 inches at the crest of the Cascade Range.

The pattern of occurrence, however, is similar to most of Oregon with majority of rain falling during the winter months.

The average annual snowfall in the lower elevations ranges from 10 to 25 inches a year and increases fairly rapidly with increases in elevation. At Crater Lake, this average is 575 inches, with nearly 900 inches having occurred in some years.

The average maximum temperatures are in the upper 80's during the warmest summer months in areas east of the Cascade Mountains. Temperatures are sometimes in excess of 100°F. in some areas.

TABLE 4 (Appendix A) shows the mean annual temperature data. Temperatures reach 90°F. or higher from 20 to 30 days annually at lower elevations and from 5 to 15 days at the higher elevations. Average minimum summer temperatures range from the mid 30's to mid 40's.

Night temperatures are comparatively cool. Subfreezing temperatures may be expected during any month of the year. In winter, average maximum temperatures range from the upper 30's to lower 50's and average minimum temperatures range from 15° to 25°F. Temperatures below zero occur nearly every winter and temperatures 25° below zero have been recorded at most stations. The coldest weather occurs when cold arctic air, which usually moves southward from Canada along the east slope of the Continental Divide, breaks across the Rocky Mountains and then moves southward between the Rockies and the Cascades.

In the mountainous areas, the average monthly mean temperatures range from 35°F. in January to 70°F. in July. The average January daily minimums are generally from 30° to 45°F. Temperatures as low as 3°F. below zero have been officially observed. However, for most years, at the lower elevations, the annual extremes will not be higher than 67°F. or lower than 41°F.

In the lower areas there is an average of 20-40 days a year with maximums of 90°F. or higher and 90-110 days with minimums of 32°F. or lower. In moving up the slopes of surrounding mountains both maximums and minimums decrease with increase in elevations. At the Crater Lake National Park headquarters, with an elevation of nearly 6,500 feet, there are an average of 234 days a year with minimums below 32°F. and less than 1 day a year with maximum above 90°F.

AIR QUALITY

Midpoint to Malin

There is very little specific air quality data available. The Idaho Department of Environmental and Community Services does not maintain any air monitoring stations in the area that would be crossed by the proposed right-of-way. According to the Oregon Department of Environmental Quality, there are no air monitoring stations east of Klamath Falls.

Air quality throughout the area is generally quite good. Pollutants associated with agricultural, urban and industrial development are generally very localized. The Boise or Treasure Valley area in the vicinity of Boise, Nampa, and Caldwell, Idaho has periods of poor air quality. Low wind velocities, particularly in the winter months, along the foothills restrict ventilation and mixing. Cold air inversions are not uncommon.

Dry basins (particularly in the Oregon portion of the area), unpaved roads, agricultural activities, range fires, etc. intermittently contribute suspended particulate matter to the atmosphere. Local concentrations can be quite high, but are generally of short duration.

Malin to Medford

The Oregon State Department of Environmental Quality (DEQ) has designated six areas within the state as air quality maintenance areas. Only one of these areas is included within the study area, Medford-Ashland. The Medford-Ashland air quality maintenance area designation is only effective for particulate contaminants.

A study by the Air Quality Division[1], Department of Environmental Quality December, 1976 discusses air quality in the Medford-Ashland area. The study is based on data from 4 suspended particulate, 2 sulphur dioxide (SO_2), 1 carbon monoxide, and 1 photochemical oxidant monitoring stations in the Medford-Ashland area. Significant improvements are apparent in the area's air quality since 1970. Particulate primary standards related to health effects are no longer being violated as they were in 1970 and previous years, and visibility has improved somewhat. The goal of reducing particulate emissions by 58% between 1970 and 1975 was almost achieved through industrial emission control efforts.

A review of microscopic analysis information and modeling results has shown that the wood products industry are major contributors to the particulate air quality problem. Veneer dryers, cyclones and log fuel boilers collectively account for at least 25-30% of the particulate emissions. Unpaved road dust, wood space heating, and motor vehicle emissions are the most important sources of particulate emissions.

Recent sampling showed that photochemical oxidents exceed the air quality standards. Levels much in excess of the "air quality alter" level

[1] "Air Quality Profile and Evaluation for the Medford-Ashland Air Quality Maintenance Area" D.E.Q., Air Quality Division, December 1976.

have been measured. A 46% reduction in reactive hydrocarbon emissions would be needed to meet the present standards. Reactive hydrocarbon emissions from veneer dryers, motor vehicles, and other industrial processes and gasoline marketing appear to be the major source of photochemical oxidents. DEQ is required to develop new control strategies for particulates and photochemical oxidants by July 1977.

Another study by Seton, Johnson, and Odell prepared for DEQ indicates that air quality standards will most likely be violated by increasing amounts in future years, in spite of minimal assumed increases in industrial emissions. Sources contributing to the regional particulates problem are varied. During 1976, percentage contributions were as follows.

Background, natural and non-inventoried sources	55%
Major wood products industry sources (cyclones, veneer driers, hogged fuel boilers)	20%
Other industrial sources	10%
Unpaved road dust	9%
Other area sources	6%
Total	100%

The 1965 particulate air quality is expected to exceed state and national standards; whereas all other contaminants, sulfur dioxide, carbon monoxide, photochemical oxidants and nitrogen dioxide, are expected to meet EPA standards for exclusion. The present and projected major source of particulate matter is from fuel combustion (TABLE II-1).

TABLE II-1
EXISTING AND PROJECTED PARTICULATE EMISSIONS, JACKSON COUNTY

Source	1970 Tons/ Year	1975 Tons/ Year	1985 Tons/ Year
Fuel Combustion	1897	1321	1859
Process Loss	550	302	350
Transportation	259	278	345
Solid Waste	805	376	392
Power Plants	0	0	0
Other	563	585	647
Total	4074	2862	3593

Source: OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Suspended particulates are monitored in Klamath Falls and also at the Oregon Institute of Technology, located about 1½ miles northeast of Klamath Falls. Particulate concentrations in Klamath Falls range from a low of 67.9 micrograms per cubic meter in November to a high of 89.0 in December, with an annual mean of 80 micrograms per cubic meter. This is slightly higher than Oregon's ambient air quality standard of 60 micrograms per cubic meter of air, as an annual mean. Particulate concentrations at O.I.T. Campus range from a low of 26.1 micrograms per cubic meter in June to a high of 63.4 in January, with an annual mean particulate concentration of 37.8 micrograms per cubic meter of air. This is well below Oregon's ambient air quality standard.

Primary contributors to particulates in the air are nature, agriculture, industry, and the community. The two largest contributors of particulate matter are nature and agriculture, contributing soil dust and pollen during the late spring, summer, and early fall. The primary sources of soil dust are barren fields, dry lake beds and unsurfaced roads. Trees, grain crops such as wheat, and hay are the primary sources of pollen.

Industry contributes soil dust, smoke, and wood dust throughout the year. Smoke and wood dust originate at lumber mills in the area. The primary sources of soil dust are unsurfaced roads, rock crushing and other industrial operations.

Home heating units in the community contribute smoke to the atmosphere mostly during the winter months.

GEOLOGY-TOPOGRAPHY

Midpoint to Medford

Table II-2 summarizes the geology and topography by proposed route segment between the Midpoint substation and the proposed Medford substation. Topography along each segment is shown on maps A and B in the Appendix.

TABLE II-2

Summary of the Geology and Topography along Pacific's Proposed Transmission Line Route

Route Segment	Geologic Materials	Topography
Midpoint to Malin		
Midpoint to Hagerman	basalt	plains
Hagerman to Owyhee Junction	locustrine sediments basalt rhyolite alluvium	terraces plains hills mesas
Owyhee Junction to Catlow Junction	basalt rhyolite tuffs locustrine sediments	plateaus canyons basins hills playas terraces
Catlow Junction to Malin	basalt locustrine sediments tuffaceous sediments	basins plains plateaus hills playas terraces
Malin to Medford		
Malin to Stukel	basalt locustrine sediments	terraces basins
Stukel to Green Springs	basalt andesites pyroclastics	mountains mountains mountains
Lookout to Medford	andesites pyroclastics basalt	mountains mountains mountains

MINERAL RESOURCES

Midpoint to Malin

Midpoint to Hagerman Segment

No mineral deposits have been identified along the proposed right-of-way from the Midpoint substation west to the Snake River. Some commercial sand and gravel deposits are located along the Snake River.

Hagerman to Owyhee Junction Segment

No known mineral resources or mining districts would be crossed by the proposed right-of-way from the Snake River crossing westward to the Owyhee Mountains. It would cross lands potentially valuable for geothermal resource development along the Snake River Plains between the Bruneau River and the eastern edge of the Owyhee Mountains.

The proposed right-of-way would cross the old Silver City - De Lamar mining district in the Owyhee Mountains. The district encompasses the Silver City area on North Mountain and the South Mountain area of the Owyhees. It was primarily a gold mining area, but also produced some lead, copper and zinc. The proposed right-of-way would pass between the old mining areas in the vicinity of Jordan Creek.

No known mineral resources or mining districts would be crossed from the Jordan Creek area westward to the Owyhee Junction near Rome. A prospectively valuable geothermal area is located about two miles north of the proposed right-of-way in the Jordan Valley, Oregon area.

Owyhee Junction to Catlow Junction Segment

From the Owyhee Junction southwesterly to the vicinity of Fields, Oregon no known mineralized areas would be crossed by the proposed transmission line right-of-way. However, it would cross the Alvord Desert area which is prospectively valuable for geothermal resources. The proposed route would cross through this area from northeast of Fields to the Catlow Junction located in the southeastern part of Catlow Valley.

Catlow Junction to Malin Segment

From the Catlow Junction westward the proposed route would not cross any known mineralized areas until the Warner Valley - Crump Lake area. Beginning here it would cross areas prospectively valuable for geothermal resources on through the Goose Lake (Lakeview) valley to the Dry Creek area near the California border southwest of Lakeview. The proposed route would cross about one mile southeast of ongoing uranium activity in the Cottonwood area northwest of Goose Lake Valley. Exxon, Utah International and Western Nuclear Corporation have located about 1000 claims in the area, based on radon detection from helicopter exploration. Geologists of the respective companies state that no immediate mining activity is anticipated because of the low grade quality of the deposits. The companies are trying to isolate actual uranium deposits and then hold them on inventory until such time as the demand for low grade uranium increases.

From the Dry Creek area westward to the Malin substation the proposed route would cross southern Langell Valley which is prospectively valuable for geothermal resources.

Malin to Medford

The following discussion concerns areas adjacent to the proposed route as discussed in various federal publications for southern Oregon (U.S. Department of Interior, Geological Survey 1969; U.S. Department of Interior, Bureau of Land Management 1971).

No metalliferous deposits are known to occur within the proposed route. Non-metallic minerals (peat, jasper, agate, volcanic cinder, sand and gravel) are scattered throughout the area traversed by the proposed route. Reed-sedge peat is present in extensive deposits of unknown thickness in the Klamath Basin, (Peterson and McIntyre 1970). The semi-precious stones, jasper and agate, occur in Agate Flat southeast of Ashland. Deposits of volcanic cinders which are found suitable for construction purposes have been identified within the Cascade region adjacent to the proposed route. Sand and gravel occur in several areas, including stream channels, flood plains, alluvial fans and deltaic deposits. These deposits are widely distributed and as yet have not been developed except in localized areas. No important mineral or petroleum fuels have been identified within the region (U. S. Department of Interior, Geological Survey 1969).

Geothermal Resources - In response to recent interest in geothermal energy, exploration rights for this potential resource were established by the Geothermal Steam Act of 1970. As provided in the Federal Act, the U.S. Geological Survey conducted a reconnaissance of geothermal areas in nine western states to determine known geothermal areas. These areas are designated "known geothermal resource area" (KGRA's) and are indicative of lands that may warrant investments for extraction of geothermal steam or related resources. The extent of KGRA's is influenced by such geological factors as patterns of temperature gradient, structure, stratigraphy, porosity, conductivity and heat source. Identified KGRA's along the proposed route are found exclusively in Klamath County, Oregon. This area is described below.

Within the city of Klamath Falls is Oregon's major geothermal display. Hot water from springs and shallow wells have been used for space heating since 1900 (Gron 1966). The hot water occurs in an elongated northwest trending zone about a half mile wide by several miles long adjacent to the Klamath graben faults. Underlying rocks are Pliocene and Pleistocene lacustrine sediments with intercalated lava flows and pyroclastic rocks (U.S. Department of Interior, Geological Survey 1969). This sequence is relatively impermeable, and only by the fault break does water leak to the surface. About 350 wells have been drilled in and around Klamath Falls, and large amounts of 200^{o}F water having been found at about 250-300 feet.

In addition to this KGRA site, land potentially valuable for exploration has also been designated by the U.S. Geological Survey. These areas are referred to as geothermal resource provinces (GRP) and have higher than normal water temperatures at subsurface which may be indicative of reservoir rocks that will yield steam or heated fluids.

SOILS

Midpoint to Medford

The following soils descriptions are adapted from the Columbia-North Pacific Region Comprehensive Framework Study, Appendix IV, Volumes 1 and 2 and Oregon's Long-Range Requirements for Water, Appendix I-14 and I-15 (Klamath and Rogue Drainage Basins).

The major soils that would be crossed by Pacific's proposed right-of-way from Midpoint, Idaho to Malin, Oregon and from Malin to Medford, Oregon are shown on Maps A-1 and B-1 in the Appendix of the Draft Statement.

TABLE II-3 provides information, by route segment, about the dominant soils that would be crossed by Pacific's proposed Midpoint to Malin right-of-way. TABLE II-4 provides the same data for the area from the Malin substation to the substation proposed for the Medford area. TABLE II-5 shows the range in existing rates of erosion for each line segment from Midpoint to Medford.

The numerical symbol in the first column of each table corresponds with the soils symbols on Maps A-1 and B-1 in the Appendix of the Draft Statement.

The tables are organized to show land characteristics and the characteristics, qualities, and some interpretations of the dominant soils in a corridor one mile wide on either side of the proposed right-of-way. The first five columns show some general land characteristics for the dominant soil. The next 10 columns show characteristics of the soils that would be crossed by the proposed right-of-way. The following four show qualities inferred from the characteristics of these soils and the last column lists potential soil problems.

Terms listed for permeability of water through the subsoil and permeability of substratum are:

Very rapid:	Over 10 inches per hour
Rapid:	5 to 10 inches per hour
Moderately rapid:	2.50 to 5 inches per hour
Moderate:	0.8 to 2.5 inches per hour
Moderately slow:	0.2 to 0.8 inches per hour
Slow:	0.05 to 0.2 inches per hour
Very slow:	Less than 0.05 inches per hour

Terms listed for total available water-holding capacity are:

Low:	Less than 6 inches in profile
Medium:	6 to 10 inches
High:	More than 10 inches in profile

A dash indicates that a column does not apply or there is insufficient knowledge to complete it.

Compaction occurs whenever the natural soil structure is altered so the pore space is reduced. The degree of compaction depends upon the energy applied, texture, moisture content and organic matter content. All genetically derived soils along the proposed route have the potential to be compacted to some degree.

TABLE II - 3

SOILS TRAVERSED BY THE PROPOSED R-O-W CORRIDOR FROM MIDPOINT, IDAHO TO MALIN, OREGON

Soil Association					Classification			Position on Landscape	Soil Characteristics					Soil Qualities and Interpretations					
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capability	Major Soil Problems
Midpoint to Hagerman Segment																			
13	2,500-6,000	8-12	100-140	Rangeland Cropland (Cereals, potatoes, beans, & hay) 80% irrigated	Xerollic Calciorthids	Coarse silty, mixed, mesic	Portneuf	Lava Plains	Loess	Silt loam	Silt loam	None	---	60"+	Moderate	Impervious	Good	High	Erosion; droughtiness
Hagerman to Owyhee Junction																			
13	2,500-3,900	11-15	90-120	Rangeland Cropland (hay & cereals) irrigated	Typic Argixerolls	Fine, montmorillonitic mesic	Keating	Uplands (hills)	Loess & Basic igneous rock	Silt loam	Clay loam	None	---	20-40" over bedrock	Moderate	Impervious	Good	Low	Erosion; Mod. deep over bedrock
12	2,300-4,000	7-11	120-140	Rangeland Cropland (Cereals, alfalfa, & potatoes) 70% irrigation	Xerollic Camborthids	Loamy mixed, mesic	Trevino	Uplands & (lavabasic plains)	Loess igneos rock	Silt loam	Silt loam	None	---	10-20" over bedrock	Moderate	Impervious	Good	Low	Erosion; shallow over bedrock; alkaline subsoil; droughtiness

TABLE II - 3

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major Land Use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capability	Major Soil Problem
Hagerman to Owyhee Junction Segment (contd.)																			
28	3,500-7,500	12-15	100-400	Rangeland Cropland (cereals and hay) some irrigated	Typic Argixerolls	Fine loamy mixed, mesic	Brownlee	Uplands (hills)	Acid igneous rock	Coarse sandy loam	Coarse sandy clay loam	None	---	40-60" over bedrock	Moderately slow	Impervious	Good	Medium	Erosion; sandy profile
8	2,000-3,000	7-12	120-165	Rangeland Cropland (cereals potatoes, mint, hops, vegetables, & hay) irrigated	Typic Haplargids	Fine loamy mixed, mesic	Nanyton	Terraces	Alluvium	Gravelly loam	Gravelly clay loam	Gravel	20-35 in profile	60"	Moderately slow	Moderately slow	Good	Low & Medium	Erosion; alkaline; gravelly profile; droughtiness
17	4,500-6,000	12-16	80-130	Rangeland Cropland (hay & some cereals) irrigated	Calcic Argixerolls	Fine, montmorillonitic, mesic	Gem	Uplands (hills undulating to steep)	Loess over basic igneous rock	Loam	Clay loam	None	---	20-40" over bed rock	Moderately slow	Impervious	Good	Low & Medium	Erosion; moderately deep over bedrock

TABLE II - 3

Soil Association					Classification				Soil Characteristics							Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze Free Season Days	Major Land Use	Great Group or Subgroup	Family	Series	Position on Landscape	Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capability	Major Soil Problems
Hagerman to Owyhee Junction Segment (cont.)																			
20	5,500-8,000	15-25	20-80	Rangeland Forest land	Argic Pachic Cryoborolls	Fine-loamy mixed	Harmehl	Uplands (hills, level to steep)	Loess & basic igneous rock	Gravelly loam	Gravelly clay loam	Gravel	20-30 in prcfile	20-40" over bedrock	Moderately slow	Impervious	Good	Low	Erosion; gravelly profile
3	4,000-5,500	8-12	90-120	Rangeland Cropland (hay) irrigated	Haplic Durargids	Fine-loamy mixed, frigid		Fans & terraces	Alluvium	Gravelly loam	Gravelly loam	Gravel	20-35 in profile	8-20" over silica duripan	Moderate	Impervious in duripan	Good	Low	Erosion; shallow over duripan; gravelly profile
21	4,800-5,700	8-16	60-100	Rangeland Cropland (isolated patches of hay-grain-pasture) irrigated	Aridic Lithic Haploxerolls	Loamy-skeletal, mixed, mesic	Bakeoven	Upland (lava plains nearly level to very steep	Basic igneous rock	Stony loam	Stony clay loam	Stones cobbles & gravel	20-35 in profile	10-20" over bedrock	Moderately slow	Impervious	Good	Low	Shallow over bedrock; stony

TABLE II - 3

Soil Association				Classification			Position on Land scape	Soil Characteristics							Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major Land Use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capability	Major Soil Problems
Owyhee Junction to Catlow Junction Segment																			
21	4,800-5,700	8-16	60-100	Rangeland Cropland (isolated patches of hay, grain, pasture) irrigated	Aridic Lithic Haploxerolls	Loamy skeletal, mixed, mesic	Bakeoven	Uplands (lava plains nearly level to very deep)	Basic igneous rock	Stony loam	Stony clay loam	Stones, cobbles & gravel	20-35 in profile	10-20" over bedrock	Moderately slow	Impervious	Good	Low	Shallow over bedrock; stony profile
2	4,000-5,500	8-12	90-120	Rangeland Cropland (hay) irrigated	Haplic Durargids	Fine, loamy, mixed, frigid		Fans & terraces	Alluvium	Gravelly loam	Gravelly loam	Gravel	20-35 in profile	8-20" over silica duripan	Moderate	Impervious	Good	Low	Erosion; shallow over diripan; gravelly profile
10	4,000-8,000	8-15	80-120	Rangeland Cropland (irrigated hay & pasture) limited	Lithic Zerollic Haplargids	Clayey mixed, frigid	Hart	Uplands (gently sloping plateaus)	Basic igneous rock	Very stony loam	Clay	Stones	35-80 in top 10"	10-20" over bedrock	Slow	Impervious	Good	Low	Shallow over bedrock; stony surface soil

TABLE II - 3

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major Land Use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capability	Major Soil Problems
Owyhee Junction to Catlow Junction Segment (cont.)																			
4	4,000-4,400	8-12	90-120	Cropland (pasture & hay)	Haplargids, Natragids	Fine silty mixed mesic		Old lake basins	Lake sediments	Sandy loam to silt loam	Silt loam	None	--	80"	Moderate	Moderate	Good	High	Alkaline soil
Catlow Junction to Malin Segment																			
10	4,000-8,000	8-15	80-120	Rangelane Cropland (irrigated hay & pasture) limited	Lithic Zerollic Haplargids	Clayey, mixed, frigid	Hart	Uplands (gently sloping plateaus)	Basic igneous rock	Very stony loam	Clay	Stones	35-80 in top 10"	10-20" over bedrock	Slow	Impervious	Good	Low	Shallow over bedrock; stony surface soil
8	4,000-4,400	8-12	90-120	Rangeland Crop land (hay, pasture, & cereals) 85% irrigated	Haplorthents	Fine, mixed, mesic		Lake basins	Lake sediments	Silty clay	Silty clay	None	--	60"+	Slow	Slow	Somewhat poor & moderately good		Wetness

TABLE II - 3

Catlow Junction to Malin Segment (cont.)

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major Land Use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water Holding Capability	Major Soil Problems
3	4,000-5,500	8-12	90-120	Rangeland Cropland (hay) irrigated	Haplic Durargids	Fine, loamy, mixed, frigid		Fans & terraces	Alluvium	Gravelly loam	Gravelly loam	Gravel	20-35 in profile	8-20" over silica	Moderate	Impervious in duripan	Good	Low	Erosion; shallow over duripan; gravelly profile
7	4,000-5,000	8-10	90-130	Rangeland Cropland (ltd. pasture) 50% irrigated	Haplic Zerollic Durargids	Fine, loamy, mixed, mesic	Flagstaff	Basins & terraces	Lake sediments	Silty loam	Silty clay loam	None	--	20-40" over hardpan	Moderately slow	Impervious in hardpan	Somewhat poor	Low & Medium	Moderately deep over hardpan; alkaline soil
16	5,000-7,500	16-25	40-90	Forest land Rangeland	Argixierolls plus Cryandepts & Haploxerolls	Loamy, skeletal & fine montmorillonitic, frigid		Uplands (ridge slopes)	Acidic igneous rock	--	--	--	--	10-70"+ over bedrock	Moderate	--	Good	Medium	Erosion with improper land use

TABLE II - 3

Soil Association					Classification			Position	Soil Characteristics					Soil Qualities and Interpretations					
Map Sym.	Elevation Feet	Pricip. Inches	Freeze free Season Days	Major Land Use	Great Group or Subgroup	Family	Series	Position on Landscape	Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water Holding Capability	Major Soil Problems
Catlow Junction to Malin Segment (cont.)																			
2c	4,500-5,500	15-18	50-90	Rangeland	Lithic Argixierolls	Clayey Merey, mont. frigid	Merlin	Tablelands	Tuff	Stony loam	Clay	Stone	10	10-20	Slow	Impervious	Good	Very low	Stoniness; shallow depth
3a	4,500-6,500	18-25	50-90	Timber	Pachic Ultic Argixierolls	Loamy skeletal, mixed, frigid	Woodcock	Mountains	Coluvium	Stony loam	Clay loam	Stone	45	40-60	Moderate	--	Well	Medium	Cold temperatures

TABLE II - 4
SOILS TRAVERSED BY THE PROPOSED R-O-W CORRIDOR FROM MALIN TO MEDFORD, OREGON

Soil Association					Classification			Soil Characteristics							Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major Land Use	Great Group or Subgroup	Family	Series	Position on Landscape	Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capability	Major Soil Problems
Malin to Stukel Segment																			
3a	4,200-6,000	12-16	90-120	Range	Aridic Lithic Argixierolls	Clayey montmesic	Lorella	Uplands	Basalt	Loam	Clayey	--	--	10-20	Slow	--	Good	Very low	Stones; droughtiness
3c	4,500-6,500	18-25	50-90	Forest	Pachic Ultic Argixierolls	Loamy skeletal, mixed, frigid	Woodcock	Uplands	Colluvium	Stony loam	Clay loam	Stone	45	40-60	Moderate	--	Well		Cold temp., erosion
Stukel to Green Springs Segment																			
3c	4,500-6,500	18-25	50-90	Forest	Pachic Ultic Argixierolls	Loamy skeletal, mixed, frigid	Woodcock	Uplands	Colluvium	Stony loam	Clay loam	Stone	45	40-60	Moderate	--	Well		Cold temp., erosion
3b	4,050 4,200	10-14	90-120	Pasture	Xerollic Durorthids	Coarse loamy, mixed, mesic	Henley	Bottom lands	Alluvium	Loam	Loam	--	--	20-40	Moderate	--	Somewhat poor		Alkalinity

TABLE II - 4

Soil Association					Classification			Position on Land scape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major Land Use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capability	Major Soil Problems
Stukel to Green Springs Segment																			
1c	4,800 6,500	35-50	50	Woodland	Typic Xerochrepts	Loamy skeletal, mixed, frigid	Oatman	Mountainous slopes	Colluvium	Gravelly loam	Cobbly loam	Cobbles & Stones	45	40-60	Moderate	--	Good	Medium	Steep slopes; erosion
Green Springs - Lookout																			
4d	2,000-3,500	40-60	70-100	Woodland	Ultic Haplo-Xeralts	Fine, loamy, mixed, mesic	Freezener	Mountainous slopes	Basalt colluvium	Loam	Clay loam	Cobbles & Stones	25	40-60	Moderate, slow	--	Well	High	Steep slopes; erosion
Lookout - Medford																			
1c	4,800-6,500	35-50	50	Woodland	Typic Xerochrepts	Loamy, skeletal, mixed, frigid	Oatman	Mountainous slopes	Colluvium	Gravelly loam	Cobbly loam	Cobbles & Stones	45	40-60	Moderate	--	Good	Medium	Steep slopes; erosion
4d	2,000-3,500	40-60	70-100	Woodland	Ultic Haplo-Xeralts	Fine, loamy, mixed mesic	Freezener	Mountainous slopes	Basalt colluvium	Loam	Clay loam	Stone	25	40-60	Moderate, slow	--	Well	High	Steep slopes; erosion

TABLE II-5

Range in existing erosion[1/] in tons per acre per year by route segment.

Route Segment	T/Ac/Yr
Midpoint to Malin	
Midpoint to Hagerman	0.12 to 0.62
Hagerman to Owyhee Junction	0.62 to 1.25
Owyhee Junction to Catlow Junction	0.12 to 1.25
Catlow Junction to Malin	0.62
Malin to Medford	
Malin to Stukel	0.62
Stukel to Green Springs	0.62
Green Springs to Lookout	0.12 to 0.62
Lookout to Medford	0.12 to 0.62

1/ Erosion was derived by multiplying the range in existing sediment yield by two. This process and the assumptions are described in Chapter III.

WATER RESOURCES

Midpoint to Malin

The following information was adapted from the Columbia-North Pacific Region Comprehensive Framework Study, Appendix V.

Midpoint to Hagerman Segment

Major surface waters include Little Wood, Big Wood, and Snake Rivers. Mean annual runoff ranges from 0.5 inches in the Snake River Plains to 40 inches in the higher mountainous areas. The flood peak is mostly from snowmelt and occurs in April. Mean annual precipitation ranges from about ten to 45 inches.

Streamflows near the source of most tributaries are relatively dilute calcium bicarbonate with 100 mg/l or less dissolved solids. Dissolved solids and sodium content show a marked increase as the water proceeds downstream. Streams entering the Snake River from the south have higher percentages of sodium, chloride, and sulfate than those entering from the northeast.

Sediment yield ranges between 0.02 and 0.1 acre-feet per square mile per year. Surface water is used chiefly for irrigation.

There are two major ground water aquifer units in this area. Recharge is mostly from direct rainfall and snowmelt during the spring and early summer. Storage depths range from 50 to 100 feet in much of the area.

Water quality is generally good to excellent. Dissolved solids are usually less than 500 mg/l. The water is chiefly calcium magnesium bicarbonate type. Silica ranges from 20 to 50 mg/l. In general, sodium hazard is low and salinity hazard low to medium.

Ground water is used for irrigation, industrial and domestic purposes.

Hagerman to Owyhee Junction Segment

The Bruneau River is the major surface water resource in this area. Annual runoff is probably less than 1 inch for the area. Much of the lower elevation terrain away from the influence of the mountains may have annual precipitation of about 8 inches with intermittent snow cover. Streamflow from rivers in this area all show a single annual flood peak in April and May as a result of snowmelt. The Bruneau basin has sediment yields ranging from 0.1 to 0.2 acre-feet/square mile/year. Surface water is chiefly used for irrigation, livestock, recreation, and wildlife.

Ground water aquifers over much of the southern portion of the area have not been tested, but small aquifers which yields up to 500 gallons per minute underlie many of the larger streams.

Recharge in the valleys and basins is partly from lateral ground water inflow and precipitation, but is chiefly from irrigation. Aquifers in this basin may have less than 500 mg/l dissolved solids. Sodium and fluorides content is sometimes excessive. Water from many wells is warm to hot. Ground water is used for irrigation, industry, and public supplies.

Owyhee Junction to Catlow Junction Segment

The major river is the Owyhee. The major stream is Trout Creek, which drains into the Alvord Desert. Annual runoff is probably less than 1 inch. Much of the lower elevation terrain away from the influence of the mountains may have annual precipitation of about 8 inches with intermittent snow cover.

Streamflows all show a single annual flood peak in April and May as a result of snowmelt. The Owyhee River is fairly dilute with calcium bicarbonate mineral in the upper reaches during high flow periods (100-200 mg/l). The remainder of the year these waters change to a sodium bicarbonate composition.

Sediment yield from the headwaters of the Owyhee River is quite low - 0.02 to 0.1 acre-feet/square mile/year. The remainder of the Owyhee basin yields 0.1 to 0.2 acre-feet/square mile/year. Water is used chiefly for irrigation, livestock, recreation, and wildlife.

Ground water aquifers over much of the southern portion of this area have not been tested, but small aquifers which yield up to 500 gallons per minute underlie many of the larger streams. Base flow in the headwaters of the Owyhee River is maintained by ground water discharge from hundreds of small tributaries.

Recharge in the valleys and basins is from lateral ground water inflow and precipitation.

Ground water from alluvial deposits in the Owyhee basin generally has less than 300 mg/l dissolved solids, mostly calcium magnesium bicarbonate from non-irrigated areas, and is hard with no sodium hazard. Irrigated areas generally have less than 500/mg/l dissolved solids with some sodium hazard.

Other aquifers in this basin may have less than 500 mg/l dissolved solids, with the water hard to very hard, and with sodium and fluorides sometimes excessive. Water from many wells is warm to hot. Ground water is used for irrigation, industry, and public supplies.

Catlow Junction to Malin Segment

Streams in the west side of this area show two annual peaks, one in December, and a second in April or May from snowmelt. These include Thomas, Drews and Cottonwood Creeks. East side streams have only one annual peak in April or May. These include the Silvies River, Cow Creek, the Donner and Blitzen River which drains into Malheur Lake and Silver Creek which drains into Harney Lake.

The streams have generally high water quality. Sediment yield is believed to be less than 0.1 acre-foot per square mile per year. The waters are primarily calcium-magnesium bicarbonate type and low in dissolved solids and hardness.

The lakes into which these streams drain are subject to intense evaporation and the mineral content of these waters may be several hundred times that of the streams. Several of these lakes contain water with a dissolved solids content in excess of 30,000 mg/l. As the mineral concentration increases, certain salts will precipitate out; calcium carbonate and calcium

sulfate (gypsum) are the least soluble. The dissolved solids content consists of sodium, bicarbonate, and chloride. Surface water is used chiefly for irrigation, livestock, wildlife and recreation.

This area is underlain by alluvial deposits and rock aquifers capable of yielding moderate to large supplies of ground water. Availability of ground water is limited by the depth of water, which is over 500 feet in many places and over 1000 feet at some locations.

Ground water quality is generally poorer than other areas. Dissolved solids are normally less than 1000 mg/l. Excessive sodium, boron, and fluoride causes problems at some wells. This area contains the greatest concentration of thermal springs of any area in Oregon. Ground water is primarily used for irrigation and domestic purposes.

Malin to Medford

The following information was adapted from Klamath Basin, 1971, Oregon State Water Resources Board and the Columbia-North Pacific Region Comprehensive Framework Study, 1960.

Malin to Stukel to Green Springs Segments

Major surface tributaries that would be crossed by or are in close proximity to Pacific's proposed right-of-way include the Lost and Klamath Rivers. Mean annual runoff is 249,000 acre-feet for the Klamath River Basin in Oregon and 102,000 acre-feet for the Lost River. Most runoff occurs from March through May.

The Lost River drainage has intensive irrigation use. Hazards exist in Klamath River for the dissolved oxygen content to drop below the level required for fish life. Iron concentrations are high for most uses. Water varies from the calcium-sodium bicarbonate to sodium-calcium bicarbonate. Use is for irrigation, industrial and domestic purposes.

The Lost River, as a principal source of water for irrigation, is used mostly as an irrigation channel. Minerals and nutrients from the geological and agricultural environments progressively degrade downstream water quality. Water type varies from calcium-sodium bicarbonate to sodium-calcium sulfate bicarbonate. Sediment yield is believed to be less than 0.1 acre-foot per square mile per year.

Most ground water supplies yield an abundant supply of relatively good quality water. Thermal wells are high in boron, chloride, sodium, sulfates and fluoride and are generally unsuitable for domestic and most irrigation uses. Ground water is used for irrigation, heating, industry, and public supplies.

Green Springs to Lookout to Medford Segments

In the Medford area, surface runoff, which is used primarily for recreation and livestock, is mostly from winter rainfall at lower elevations. In the upper Rogue River Basin it is mainly from snowmelt. The proposed right-of-way does not cross nor come close to any major rivers in this area. Upper

reaches of the Rogue River contain about 60 mg/l of dissolved solids. All streams are of excellent mineral character. Sediment yield ranges from 0.02 to 0.1 acre-foot per square mile per year.

Detailed information concerning the ground water in the remote mountainous areas that would be traversed by the proposed route is not available. The area is generally capable of yielding large quantities of ground water. The water table may be far below the land surface in many areas. Ground water is used primarily for domestic purposes.

Water Rights

Midpoint to Malin

Water rights to surface waters in the southern Idaho area have mostly been adjudicated for irrigation. There has been no area or basin-wide adjudication of ground water rights in Idaho. Ground water has been extensively developed within the Snake River Basin. Rights consist mainly of irrigating use under permits and licenses.

Considerable ground water development under permits and licenses has occurred in Owyhee County. Surface water streams in this area are essentially developed and artesian water is available.

There are a number of water rights on file in Oregon for the Malheur and Owyhee Basins. Two hundred thirty-one wells were on file in 1967 for the Malheur and Goose Lake Valleys. These are used for irrigation, domestic, municipal and industrial uses.

Malin to Medford

The Klamath River Basin has a compact which was ratified by Oregon and California and provides a legal basis for the use of the surface waters between the two states. Water rights allow a depletion of 3,451,548 acre-feet per year. Irrigation rights have a seasonal limit. Rights other than those for irrigation are continuous throughout the year. Rights issued after the compact are contingent upon priority of use. Some water is diverted into the Rogue Basin for irrigation purposes. The State Engineer's Office in Salem, Oregon, may be contacted for detailed information about Oregon water rights.

NOISE

Midpoint to Malin

The area that would be traversed by the proposed route is characterized by small, widely separated communities and sparse settlement. The majority of the lands are in public ownership and devoted to extensive land uses such as open space, recreation, grazing and agriculture. Along most of the proposed right-of-way away from communities, settlements, highways, rail lines and secondary roads, the ambient noise levels is very near that in nature without man or machines.

The ambient noise level could rise where the route crosses 9 major highways, 29 secondary roads, rail line, 31.5 miles of agriculture lands and passes near communities or settlements such as Hagerman, Fields and the Goose Lake Valley. Major noise sources in these areas include automobiles, trucks, equipment and irrigation systems.

Another audible noise effect occurs where the proposed route would cross the existing BPA 750 D.C. transmission line east of the Warner Mountains. This noise effect is the result of the high voltage phenomena known as corona discharge.

APPENDIX G of Pacific's Environmental Assessment, Midpoint, Idaho to Malin, Oregon, contains the results of a field monitoring program conducted in early 1975 to define ambient noise levels in a number of areas along the proposed right-of-way.

Ambient noise levels were found to range between 19 and 50, Median Range dB(A), depending upon weather conditions and land uses.

Malin to Medford

The area that would be traversed by the proposed route is characterized by the agriculturally developed Klamath Basin and the timberlands of the Southern Cascade Mountain Range. The majority of the lands in the Klamath Basin are in private ownership and devoted to agriculture and related uses, including scattered farm communities and residences. The lands in the Southern Cascade area is divided into mixed public and private ownership and devoted to timber production, recreation, open space and scattered residential uses.

Ambient noise levels in the Klamath Basin are increased over natural levels where the route crosses two major highways, eight secondary roads, one rail line, 9 miles of agriculture lands and passes near the communities of Malin, Merrill, Worden and Klamath Falls, together with Kingsley Field. Major noise sources in the Klamath Basin include automobiles, trucks, equipment, aircraft, irrigation systems together with migratory waterfowl hunting firearm discharge.

Ambient noise levels in the Southern Cascades are increased over natural levels where the route crosses one major highway, four secondary roads and passes near scattered residences in the Antelope Creek canyon area. Major noise sources in the Southern Cascade area include automobiles, and other highway-road vehicles, timber harvesting equipment including chain saws, trucks and other equipment, together with deer hunting firearm discharge.

VEGETATION

Midpoint to Malin

There are basically five major natural vegetative types - with distinctive dominant plant species (Franklin & Dryness, 1969) that would be crossed by Pacific's proposed right-of-way: (1) desert shrub; (2) juniper; (3) grass; (4) coniferous forest; and (5) aquatic. Agricultural areas comprise another general vegetative type.

Maps A-2 and B-2 in the Appendix of the Draft Statement illustrate where the proposed right-of-way would cross each major vegetative type.

The desert shrub type predominates over most of southeastern Oregon and southern Idaho. It is the most common vegetative type that would be crossed by the proposed right-of-way. Desert shrub is associated with low precipitation. short growing seasons, and generally shallow and/or rocky soils. Shrubs of various types form the overstory and dominate an understory of grasses and sometimes forbs. (FIGURE II-3)

Sagebrush is by far the most predominant shrub. Big Sagebrush is the most common variety. Low Sage occurs less extensively. Other dominant shrubs include rabbitbrush, bitterbrush, hopsage, and shadscale. Greasewood is found on alkaline sites generally on or near old lakebeds.

The most important species making up the grass understory include bluebunch wheatgrass, squirreltail, Idaho fescue, sandberg bluegrass, needlegrass and cheatgrass. Associated forbs include phlox, mountain dandelion, hawksbeard, lupine and larkspur.

Juniper stands are generally found interspersed throughout the desert shrub type or on the fringe of the coniferous forest type at intermediate elevations with low precipitation. (FIGURE II-4)

Because of very similar ecological requirements, juniper is found in association with or immediately adjacent to sagebrush. Juniper generally occurs on sites more rocky and dry. At present, it seems to be invading adjacent grass and/or brush types.

Western juniper is the major species occurring along the proposed right-of-way. It is usually found with a shrub understory, most commonly big sagebrush, rabbitbrush, low sage or bitterbrush. Grasses commonly found in the understory include bluebunch wheatgrass, Idaho fescue, sandberg bluegrass, needlegrass, squirreltail, junegrass and cheatgrass.

Natural "grasslands" are rare in the area that would be crossed by Pacific's proposed right-of-way. They are generally the "meadow" type associated with moist sites and heavy soils.

Many areas throughout the desert shrub and juniper vegetative types where soil and moisture conditions are favorable have been converted to

FIGURE II-3
Typical Desert Shrub Vegetative Type

FIGURE II-4
Typical Juniper Type, Southwest Idaho

grasslands. The shrub or juniper overstory has been eliminated by mechanical or chemical means, and the area seeded to perennial grasses - usually crested wheatgrass. These "range" seedings comprise the majority of grass-dominated areas found along the proposed route (FIGURE II-5). Some areas of annual grasses are also found. These are principally cheatgrass and other annual bromes.

The coniferous forest vegetative type is found along the proposed route in Southcentral and Southwestern Oregon. It can be generally described as the "Montane Coniferous" type. (FIGURE II-6).

Forest of this type generally reproduce with difficulty or grow slowly, have relatively open canopies, and tend to have sparce understory, shrub and herbaceous layers (exceptions are commonplace). Plant succession following removal of the forest usually follows three stages i.e., herbs, to shrubs, to conifers. One or both of the first two stages may not occur on any given area, or may persist for an exceedingly long period of time. To facilitate the vegetative description the Montane Forest is divided into two regions, Southwestern Oregon and Eastern Oregon.

Southwestern Oregon

This region may be viewed as having five major (elevational) zones (Franklin & Dyrness, 1969, pp. 77-103). From low to high elevation these are, (1) the "Mixed Conifer" & "Mixed Evergreen Zone," (2) the "White Fir Zone," (3) the "Red Fir Zone," (4) the "Mountain Hemlock Zone," and (5) "Timberline." These zones reflect climatic conditions inherent with elevational differences. The lowest zone, the "Mixed Conifer" & "Mixed Evergreen" is warm and dry while higher zones, such as the "Red Fir' and "Mountain Hemlock" zones are cool and moist.

Within the "Mixed Conifer" and "Mixed Evergreen" and "White Fir" zones, species may vary between relatively "cool-moist" and "warm-dry" sites.

Plant succession is normally slow following removal of the forest on relatively "warm-dry" sites in the "Mixed Conifer" and "Mixed Evergreen" and "White Fir" Zones. Plant succession on relatively "cool-moist" sites is normally more rapid provided other interfering conditions, such as animal damage, is not limiting.

A notable successional characteristic within these zones is a strong tendency towards development of extensive, dense brushfields of dry-site species and subsequent delay in establishment of coniferous seedlings, especially where fire has occurred (Franklin & Dyrness 1969, pp. 77-103). Species common to this successional stage are often those typical of the Broad Sclerophyll.

Eastern Oregon

This region may be viewed in terms of climax zones. (Franklin and Dyrness 1969, pp. 110-140). The seven zones present include (1) the (usually) lowermost "Ponderosa Pine Zone;" mid-elevational zones of (2) "Douglas-fir," (3) "Grand (or White Fir)," (4) "Lodgepole Pine" and (5) "Western Hemlock;" (6) the higher "Subalpine Fir Zone," and (7) "Timberline."

FIGURE II-5
Typical Range Seeding Vegetation Type

FIGURE II-6
Typical Montane Coniferous Forest Type

Throughout this region an important distinction is that zones do not always occur on a single mountain, nor do they always occur in sequential belts. Depending upon locale, the upper limit of the "Ponderosa Pine Zone" for example, may grade into any of the four mid-elevational zones. Also, the "Ponderosa Pine Zone" may be absent; the Juniper or desert shrub then grade into the Douglas-fir or other mid-elevational zone. Generally speaking, the "Ponderosa Pine Zone" is warm and dry and the "Subalpine Pine Zone" cool and moist; other zones are model in this regard.

Relatively "cool-moist" and "warm-dry" sites can also be identified throughout the "Ponderosa Pine Zone" (Franklin and Dyrness 1969, pp. 110-122).

Relatively "cool-moist" sites in the "Ponderosa Pine Zone" may be ecotonal due to their close resemblance to the more mesic (moist) Douglas-fir or other mid-elevational zones. Relatively "warm-dry" sites exhibit a tendency to develop sclerophyllic brushfields following fire or other removal of the forest canopy (Franklin and Dyrness, Ibid).

Aquatic vegetation occurs in very few places along the proposed right-of-way. However, these include some very significant, locally important areas such as the Warner Valley.

Aquatic plants can generally be divided into three main categories according to water depth. Some plants typically occur in open water, others in the littoral zone, and others along the shores of lakes and river banks.

Open waters are characterized by species such as algae and duckweed. The littoral zone is characterized by rooted plants where light penetrates to submersed plants such as pondweeds and elodea. Vegetation dominating shorelines and shallower waters include typical "marsh" types such as bulrush, cattail, sedge, rush, reed, canary grass, etc. (FIGURE II-7).

Agricultural lands comprise a very small but locally significant portion of the lands that would be crossed by Pacific's proposed right-of-way. The agricultural "vegetative type" includes dryland grain crops and irrigated alfalfa, grain and row crops. (FIGURE II-8) Range seedings for livestock forage are included in the grass vegetative type rather than agricultural.

The following discussion traces Pacific's proposed right-of-way across the vegetative communities between the Midpoint Substation and the Malin Substation, and summarizes the miles, percentage of the total and acres of each type that would be crossed.

The proposed route would originate in a grass seeded (crested wheatgrass) area at the Midpoint Substation. About 2 miles west it would enter and cross about three miles of agricultural land. Then it would cross about 7 miles of desert shrub type and then 3 miles of crested wheatgrass which ends near where the proposed right-of-way would cross Highway 46. Between Highway 46 and 80N the proposed right-of-way would cross desert shrub type. From Highway 80N west to a point near the Snake River crossing north of Hagerman, it would cross approximately 4 miles of agricultural lands. From there the proposed route would turn northwest, cross the river and traverse desert shrub for about 2 miles. Proceeding west and northwest, it

FIGURE II-7
Typical Marsh Vegetation Type

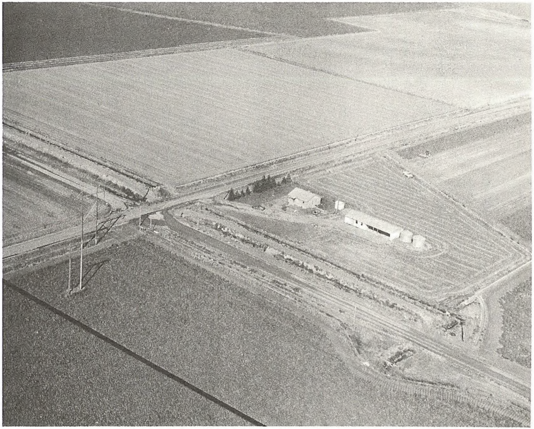


FIGURE II-8
Typical Agricultural Type - Idaho
Proposed Powerline Route

would cross agricultural lands for three miles and desert shrub for some fifteen miles to the Deadman Flat area south of Glenns Ferry.

Five miles of agricultural lands would be crossed in the Deadman Flat area, then about four miles of desert shrub between there and the Browns Creek area. Here the route would cross agricultural lands for four miles and then turn southwest and traverse desert shrub for seven miles to the Bruneau Valley.

From the east side of the Bruneau Valley to the West side of Little Valley, the route would cross about 7 miles of agricultural lands, and about five miles of desert shrub close to agricultural lands. Proceeding west from Little Valley, it would cross about 15 miles of desert shrub, then about 17 miles of annual grass type.

From near Buckaroo Spring the proposed right-of-way would cross some 55 miles of desert shrub to the Owyhee Junction north of Round Mountain. From there to the Owyhee River crossing it would cross a little more than 4 miles of a grass (range seeding) area. After crossing the Owyhee River, the proposed route would cross desert shrub for some eighty miles as it passed south to Alvord Lake, turned northwest south of the Steens Mountains and crossed through Long Hollow to Catlow Junction.

From Catlow Valley to Warner Valley the proposed right-of-way would cross approximately 50 miles of desert shrub. It would cross about 1-1/2 miles of aquatic vegetative type (marsh) between Crump and Hart Lakes and then 2 miles of grass type in Warner Valley.

After crossing Warner Valley, the proposed route would turn southwest and cross about 16 miles of desert shrub and two miles of grass type near Roaring Springs to the Fremont National Forest boundary.

Entering the National Forest, Pacific's proposed route would cross 2 miles of juniper vegetative type, 3 miles of coniferous forest and a little over a mile of grass type near Highway 140. Then the route would turn northwest through 3 miles of coniferous forest and 1 mile of juniper to the east side of Goose Lake Valley.

The right-of-way would cross agricultural lands in Goose Lake Valley, turn southwest and south down the west side of the valley traversing predominately a foothill juniper type close to the transition to valley agricultural lands. Turning west in the Dry Creek area it would continue through about 4 miles of juniper type and 10 miles of coniferous forest. The juniper type would resume in the Rock Creek area and prevail until the line would reach the Malin substation, with the exception of some minor grass and desert shrub areas.

In summary, the desert shrub is by far the predominant vegetative type that would be crossed by Pacific's proposed route. It occupies approximately 257 route miles, or nearly 66% of the total distance from the Midpoint, Idaho Substation to the Malin, Oregon Substation. Grass and juniper are the next most common types, occurring on 44 and 41 route miles respectively.

Agricultural lands are found mainly in the southern Idaho area, occupying about 8% of the land that would be crossed by the proposed route. Coniferous forest lands are found only in south-central Oregon, and occur on about 4% of the proposed route. Aquatic (marsh) lands are crossed only in the Warner Valley area and comprise less than 1% of the proposed right-of-way.

Table II-6 contains the miles of each vegetative type - by segment - that would be crossed by Pacific's proposed Midpoint to Malin right-of-way.

TABLE II-6

VEGETATIVE TYPE MILES BY ROUTE SEGMENTS

Segment	Vegetative Type/Miles						
	Shrub	Grass	Juniper	Agricltrl	Forest	Aquatic	Total
Midpoint to Hagerman	13.5	5.0		7.5			26.0
Hagerman to Owyhee	101.0	17.0		18.0			136.0
Owyhee to Catlow	79.5	5.0					84.5
Catlow to Malin	63.0	17.0	41.5	6.0	15.5	1.5	144.5
Total	257.0	44.0	41.5	31.5	15.5	1.5	391.0

TABLE II-7 depicts the total miles of each vegetative type that would be crossed, the percentage of the total for each type and the total number of acres of each type that would fall within the proposed 391-mile-long, 175-foot Midpoint to Malin right-of-way.

Malin to Medford

The area that would be traversed by Pacific's proposed right-of-way contains six major natural vegetative types based on distinctive dominant vegetative species (Franklin & Dyrness, 1969): (1) coniferous forest; (2) grass: (3) broad sclerophyll; (4) juniper; (5) desert shrub; and (6) aquatic. Agricultural areas comprise another general vegetative type.

MAP B-2 in the Appendix of the Draft Statement illustrates where the proposed right-of-way would cross each major vegetative type.

TABLE II-7

VEGETATIVE ROUTE MILES - PERCENTAGE OF TOTAL - ACREAGE

Type	Miles	Percentage	Acreage
Desert Shrub	257.0	65.7	5,452
Grass	44.0	11.2	933
Juniper	41.5	10.7	880
Agricultural	31.5	8.0	668
Coniferous Forest	15.5	4.0	329
Aquatic (marsh)	1.5	0.4	32
Total	391.0	100.0	8,294

Coniferous forest is the major type found on the proposed right-of-way. It is generally described as the "montane coniferous" type. The bulk is commercial forest and can be divided into three primary categories: (a) true firs, (b) mixed pine-fir, and (c) true pine. Stand composition generally varies with elevation, gradually changing from true pine to true fir as elevation increases.

Soil type and exposure are also important influences, and species composition will vary with cool-moist and warm-dry sites. The firs, and predominantly white fir, are the most common commercial species in this area. There are also areas of marginal or non-commercial coniferous forest, typified by pine mixed with hardwoods. (See Midpoint to Malin section for a more detailed discussion of the Montane Coniferous forest type).

Grasslands are primarily found in the low foothills and valley terraces east of the Medford-Ashland area. There are also some minor "meadow" areas in the mountainous portion of the route. Grass species include bluebunch wheatgrass, wild rye, Idaho fescue, blue grasses, squirrel tail and annuals including bromes, cheatgrass and medusahead.

The broad sclerophyll vegetative type is found only on the drier sites in the Rogue River Valley and the western slopes of the Cascade Mountains. It is characterized by an overstory of tree species with a broad, evergreen leaf (Oak-Madrone type) and an understory of "evergreen"-type brush such as manzanita, ceanothus, etc. Grasses are also found in the understory.

The Malin-Klamath Falls vicinity has some sites dominated by juniper type vegetation. This type is described in the preceding Midpoint to Malin vegetative type discussion.

Desert shrub is also found on some areas in the Malin-Klamath Falls vicinity. See Midpoint to Malin section for a discussion of this vegetative type.

The Klamath Basin area contains important areas of aquatic vegetation. See Midpoint to Malin section for a discussion of this vegetative type.

The most important agricultural lands found in the area of the proposed route are in the Klamath Basin vicinity. See Midpoint to Malin vegetative for a discussion of this type.

The following discussion traces Pacific's proposed right-of-way across the vegetative communities between the Malin Substation and the substation proposed for the Medford area. Subsequent tables summarize the miles, percentage of the total and acreage of each type that would be crossed.

Commencing at the Malin substation, the proposed right-of-way would parallel an existing 230 KV line for 3 miles through juniper type vegetation. Turning northwest and west, it would cross juniper for less than 1 mile and about 6 miles of desert shrub bordering agricultural lands south of Buck Butte.

Proceeding west, it would cross about 7 miles of juniper and desert shrub to the western base of Stukel Mountain. It would cross approximately 7 miles of agricultural lands between Stukel Mountain and the Klamath Hills. Across the south slopes of the Klamath Hills it would cross about 3 miles of desert shrub and grass types then cross nearly 7 miles of agricultural land in the Klamath Basin.

From Klamath Basin west, it would cross vegetative types grading from juniper and brush to coniferous forest south of Hamaker Mountain. From there the proposed right-of-way would cross some 34 miles of coniferous forest until reaching the Green Springs Highway (66) east of Emigrant Lake.

The area from just west of the Klamath River to south of Soda Mountain is heavily cut over and/or burned in many places. These sites have scattered pine, sclerophyll type brush and grass cover. Though still considered forested lands they are presently a mixture of forest and sclerophyll type vegetation.

The proposed route would turn north across the Green Springs Highway and pass through a grass-oak type for four miles. Then it would cross approximately twelve miles of coniferous forest until reaching the area west of Chimney Rock. There it would cross 5 miles of broad sclerophyll type and then about two miles of grass type to the proposed substation site northeast of Medford.

In summary, coniferous forest is the major vegetative type that would be crossed by Pacific's proposed Malin to Medford right-of-way. It occupies approximately 47 route miles, or more than one-half the total distance. Desert shrub, juniper, agriculture, and grass follow in that

order and are relatively equal in quantity. Broad sclerophyll types occupy 5 miles or about 5% of the total route. No aquatic (marsh) areas would be directly crossed by the proposed right-of-way, but it would be immediately adjacent to marsh areas in the Klamath Basin vicinity.

TABLE II-8 shows the miles of each vegetative type - by segment - that would be crossed by Pacific's proposed Malin to Medford right-of-way.

TABLE II-8

VEGETATIVE TYPE MILES BY ROUTE SEGMENT

Segment	Vegetative Type/Miles						
	Shrub	Grass	Juniper	Agricltrl	Forest	Brd.Sch	Total
Malin to Stukel	10	1	7	---	---	---	18
Stukel to Green Springs	1.5	2	4	9	34.5	---	51
Green Springs to Lookout	---	4	---	---	1	---	5
Lookout to Medford	---	1.5	---	---	11.5	5	18
Total	11.5	8.5	11	9	47	5	92

TABLE II-9 contains the total miles of each vegetative type that would be crossed, the percentage of the total for each type and the total number of acres of each type that would fall within the proposed 92-mile-long, 175-foot-wide Malin to Medford right-of-way.

TABLE II-10 contains the cumulative total route miles and percentage of the cumulative total occupied by each vegetative type within Pacific's proposed 483-mile-long, 175-foot-wide Midpoint to Malin to Medford electrical transmission line right-of-way.

TABLE II-9

VEGETATIVE ROUTE MILES - PERCENTAGE OF TOTAL - ACREAGE

Type	Miles	Percentage	Acreage (175' R/W)
Coniferous Forest	47.0	51	997
Grass	8.5	9	180
Agriculture	9.0	10	192
Juniper	11.0	12	233
Desert Shrub	11.5	13	244
Broad Sclerophyll	5.0	5	106
Total	92	100	1,952

TABLE II-10

CUMULATIVE TOTAL MIDPOINT - MALIN - MEDFORD
VEGETATIVE ROUTE MILES - PERCENTAGE OF TOTAL - ACREAGE

Type	Miles	Percentage	Acreage (175' R/W)
Desert Shrub	268.5	55.6	5,696
Coniferous Forest	62.5	12.9	1,326
Grass	52.5	10.9	1,113
Juniper	52.5	10.9	1,113
Agricultural	40.5	8.4	860
Broad Sclerophyll	5.0	1.0	106
Aquatic (Marsh)	1.5	0.3	32
Total	483.0	100.0	10,246

ENDANGERED AND THREATENED FLORA

The Federal Register of July 1, 1975 (Vol. 40, No. 127) contains a comprehensive list of candidate endangered or threatened plants compiled by the Smithsonian Institution and submitted to the Department of the Interior as provided for by the Endangered Species Act of 1973.

None of these plants are known to occur within Pacific's proposed right-of-way. However, TABLES II-11 and II-11a include plants on this list most likely to be found within the right-of-way, based on geographic range and habitat preference. The tables also identify other plants that deserve special consideration in management activities due to known or probable rare or endemic status, or disjunct populations. Information for the tables was provided by the Portland Regional Office of the Fish and Wildlife Service.

TABLE II-11

PLANTS OF SPECIAL INTEREST IN OREGON

The Siskiyou Mountains Province, Southwestern Oregon

Species	Distribution
Allium siskiyouense	Grassy slopes, Siskiyou Summit, Jackson County
Arabis oregona*	Rocky hillsides, southern Jackson and Josephine counties
Calochortus greenei*	Thickets, southern Jackson County
Camassia howellii	Meadows, Josephine and Jackson Counties
Cirsium ciliolatum*	Dry hillsides near Ashland, Jackson County
Cordylanthus viscidus	On serpentine, Josephine and Jackson Counties
Cupressus bakeri	Open woods, northern Jackson and southern Josephine Counties
Cypripedium fasciculatum	Coniferous forests, Josephine and Jackson Counties
Erythronium howellii*	Open woods along Illinois River, southern Josephine County
Fritillaria gentneri	Oak woodlands in foothills, Jackson and Josephine Counties
Horkelia hendersonii	Rock summit of Mount Ashland, Jackson County
Lewisia cotyledon*	Jackson, Josephine, and Curry Counties
Lilium rubescens	Wooded slopes, southern Josephine and Jackson Counties
Limnanthes floccosa ssp. bellingeriana*	Local endemic, Jackson and Klamath Counties
L. floccosa ssp. grandiflora*	Local endemic, Jackson County
L. floccosa ssp. pumila*	Local endemic, Jackson County
L. gracilis var. gracilis*	Widely disjunct populations, Josephine County, Rogue Valley
Lupinus aridus var. ashlandicus	Stony slopes, Mount Ashland, Jackson County

Species	Distribution
Microseris laciniata ssp. detlingii*	Grasslands, Siskiyou Pass, Jackson County
Mirabilis greenei	Southern Jackson County
Navarretia heterandra	Vernal pools, Jackson County
Orthocarpus cuspidatus	Grasslands, southern Klamath and Jackson Counties
Penstemon parvulus	Summit of Mount Ashland, Jackson County
Phacelia peckii*	Moist flats, southern Jackson County
Potentialla glandulosa ssp. ashlandica	Wet meadows, Mount Ashland, Jackson County
P. glandulosa ssp. globosa	Mount Ashland, Jackson County
Saxifraga fragarioides	Mountain cliffs, Josephine and Jackson Counties
Schoenolirion bracteosum*	Mountain meadows, southern Jackson and Josephine Counties
Sedum laxum ssp. heckneri*	Dry cliffs, Jackson County
S. purcyi	Associated with Brewer spruce, southern Jackson County
Trifolium howellii	Moist slopes in woods, mountains of Josephine and Jackson Counties
Vaccinium coccinium*	Sandy slopes and ridges, mountains of Josephine County

The Eastern Slopes Province, Oregon Cascades

Astragalus applegatei*	Moist meadows near Klamath Falls, Klamath County
Castilleja chlorotica*	Mountains, southern Lake County (Gearhart Mountain); Three Sisters
Crepis bakeri ssp. cusickii	Dry slopes, Jackson and Lake Counties
Eriogonum umbellatum var. glaberrimum	Warner Mountains, southern Lake County
Lomatium peckianum	Dry hillside and pine woods near BLY, Klamath County
Penstemon glaucinus*	Pine forest, Gearhart Mountain, Lake County
Salixlaevigata	Along streams, southern Klamath County
Silene nuda ssp. insectivora	Along Sprague River, Klamath County

The Basin and Range Province, Eastern Oregon

Astragalus alvordensis*	Sandy plains and hills, southern Harney and Malheur Counties (Alvord Valley)
Cirsium peckii	Streambanks, eastern slopes of Steens and Pueblo Mountains, Harney County
Eriogonum cusickii*	Rocky sagebrush areas
Lupinus biddlei*	Dry plains, southern Harney and Malheur Counties
Pleuropogon oreganus	Swampy ground, Lake and Union Counties
Ranunculus andersonii	Sagebrush desert and ponderosa pine forest; southern Lake County and southern Malheur County
Rhysopterus plurijugus*	On diatomite, Malheur, Harney, and eastern Lake Counties
Thelypodium brachycarpus*	Low, chiefly alkaline areas, southeast Oregon

* Species listed on the national list of threatened and endangered plants (Smithsonian Institution 1975).

The Owyhee Upland Province, Southeastern Oregon

Astragalus iodanthus var. vipereus	Bluffs, eastern Malheur County
A. mulfordae*1/	Dry sandy ground, lower Owyhee River, eastern Malheur County
A. nudisiliquus	Gravelly bluffs, northeastern Malheur County
A. purshii var. ophiogenes*	Sagebrush desert, Owyhee River, Malheur County
A. solitarius*	Usually in sagebrush, Owyhee River, Malheur County
A. sterilis*	Clay hills, Sucker Creek, Malheur County
Cryptantha propria	Dry hillsides, northern Malheur County
Cymopterus corrugatus*	Dry hills, southern Malheur County
Eriogonum novonudum*	Stony clay hills, eastern Malheur County
E. ochrocephalum ssp. calcareum	In loose, white volcanic ash, Malheur County
Hackelia cronquistii	Narrow endemic, known only from one site in Malheur County
H. ophiobia*	Cliffs, 3 forks of Owhyee River, Malheur County
H. patens	Between Vale and Harper, Malheur County
Mentzelia mollis*	Clay slopes, eastern Malheur County
Mirabelis bigelovii	Canyon of Owyhee River, Malheur County
Silene scaposa var. lobata*	Local endemic in Southeastern Oregon
Trifolium owyheense	Dry slopes, Sucker Creek, Malheur County

TABLE II-11a

PLANTS OF SPECIAL INTEREST IN IDAHO COLUMBIA INTERMOUNTAIN PROVINCE

Taxon	Locality	Status
Lepidium davisii*	Extension of Birds of Prey Area	Endemic
Eriogonum shockleyi var. packardi	As above	Endemic
Langloisia punctata	As above	Great Basin & Southwest outlier
Teucrium canadense	As above	Widespread in moist areas
Lepidium montanum var. papilliferum	Canyon, Payette & Ada Counties	Endemic
Circium magnificum	Alkaline meadows	Endemic
Trifolium microdon	Sandy areas	Disjunct from Pacific States
Astragalus stratus var. inseptus*	Camas County	Endemic
Section C - Owyhee Uplands		
Artemisia papposa*	S.R. plains and Owyhee Co.	Endemic
Astragalus iodanthus var. vispereus	As above	Endemic
A. sterilis*	As above	Endemic
Limosella acaulis	Southern Owyhee County	Widespread, circumboreal
Downingia elegans	Southern Owyhee County	Pacific states

* Species listed on the national list of threatened and endangered plants (Smithsonian Institution 1975).

1/ Also found in Idaho

WILDLIFE

Pacific's proposed 483-mile-long Midpoint, Idaho to Medford, Oregon 500 KV electric power transmission line right-of-way would traverse diverse wildlife habitats ranging from dry alkaline flats to coniferous forests.

Nearly 400 species of mammals, birds, amphibians, reptiles and fish are found within or immediately adjacent to the proposed right-of-way. Species are indexed by common and scientific name, by route and by habitat type where this data is available. Fisheries habitat is shown simply as "Lotic" (running streams) and "Lentic" (ponds, reservoirs, lakes and other still waters). Copies of this list are available upon request.

Some wildlife species, such as the silver-haired bat (Lasionycteris noctivagans) are common to the entire route, while the northern spotted owl (Strix occidentalis caurina) is found only in the old growth coniferous forests of the Cascade Mountains at the extreme west end of the proposed route. Unfortunately, the numbers and distribution of the wildlife species found along the proposed right-of-way is known in only a few instances.

The proposed right-of-way route is divided both geographically and by project into two sections. The first is the 391-mile section from Midpoint, Idaho to Malin, Oregon. Habitat types are typically high desert with some interspersed Montane forest. The second section, from Malin to Medford, Oregon passes through the Cascade Range and an eastern extension of the Siskiyou Mountains. Wildlife species, as well as vegetative types, are characterized by transition life-zone habitat types which are basically coniferous forest and oak mixtures.

MAPS A-2 and B-2 in the Appendix of the Draft Statement show where the proposed route would pass through or in close proximity to crucial wildlife habitats. FIGURE II-9 shows main waterfowl migration routes through Idaho and Oregon.

From Midpoint to Medford, Pacific's proposed route would pass through or adjacent to 34 big game concentrations containing approximately 35,000 animals, including mule and black-tailed deer, antelope, elk and bighorned sheep. Many of these concentrations are crucial winter ranges and include three interstate deer herds.

The proposed right-of-way would cross 7 big game management units in Oregon and 4 in Idaho.

TABLE II-12 identifies major mammal species commonly found in the area that would be crossed by Pacific's proposed Midpoint to Medford right-of-way.

According to data from the U.S. Fish and Wildlife Service and Idaho Fish & Game Department, an estimated 6,000,000 migrating waterfowl annually pass through the area that would be traversed by the proposed transmission line right-of-way. Vast, but unknown numbers of passerine (perching birds such as sparrows, robins, etc.) also migrate through the area.

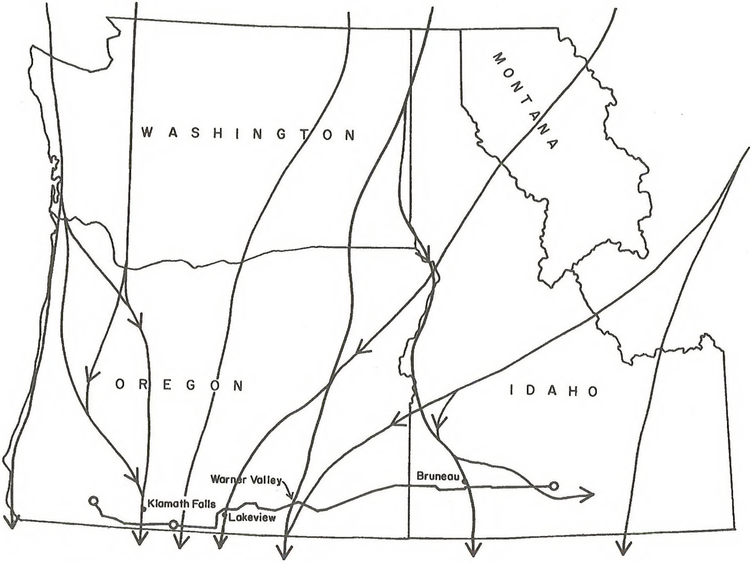


FIGURE II-9 WATERFOWL MIGRATION ROUTES →
(Flyway data from Oregon Dept. of Fisheries & Wildlife, 1975, and "Waterfowl Tomorrow," USDI, 1965)

TABLE II-12

MAMMALS COMMON TO THE PROPOSED RIGHT-OF-WAY

Common Name	Family	No. of Species
Opossums	Didelphiidae	1
Shrews	Soricidae	7
Moles	Talpidae	4
Plainnose Bats	Vespertilionidae	15
Freetail Bats	Molossidae	1
Bears	Ursidae	1
Raccoons	Procyonidae	1
Weasels, Skunks, etc.	Mustelidae	10
Coyotes, Foxes	Canidae	4
Cats	Felidae	2
Squirrels	Sciuridae	15
Pocket Gophers	Geomyidae	4
Pocket Mice, Kangaroo Mice, and Kangaroo Rats	Heteromyidae	6
Beaver	Castoridae	1
Mice, Rats, Vole	Cricetidae	20
Old World Mice	Muridae	1
Porcupine	Erethizontidae	1
Hares and Rabbits	Leporidae	6
Deer	Cervidae	4
Pronghorn	Antiliocapridae	1
Elk	Cervidae	2
Wild Horses	Equidae	1

TABLE II-13 identifies major bird species commonly found in the area that would be crossed by Pacific's proposed Midpoint to Medford transmission line right-of-way.

Distribution of fish in Oregon is based primarily on Bond (1966 and 1974), reports of the Pacific Northwest River Basin Commission (1970 and 1971), and 12 Basin Investigation Reports and Annual Reports of the Fishery Division (1964-70) of the Oregon State Game Commission.

Distribution of fish in Idaho is based upon Bureau of Land Management Idaho State Office report Distribution, Season of Use and Habitat of Mammals, Birds, Reptiles, Amphibians and Fishes of Idaho, 1975.

Common and scientific names are those recommended by the American Fisheries Society (Bailey).

Certain species of fish are classified as "game fish" by law (Oregon Game Code, 1974). Fish in Oregon and Idaho are generally grouped into the following categories: anadromous fish, cold-water game fish, warm-water game fish and non-game fish.

Major fish habitats include the Snake and Klamath Rivers and their tributaries. Anadromous fish do not have access to this habitat except possibly at the extreme west end of the proposed route near Medford.

TABLE II-14 identifies major fish families commonly found in the area that would be crossed by Pacific's Midpoint to Medford transmission line right-of-way.

Further information on species can be obtained by requesting a copy of the Fish and Wildlife Checklist for the proposed and alternate routes.

Other important aquatic life includes crustaceans such as crayfish (Decapoda), freshwater shrimp (Anostraca), and mollusks such as freshwater mussels (Pelecepoda).

TABLE II-15 identifies major amphibians and reptiles commonly found in the area that would be crossed by Pacific's proposed Midpoint to Medford transmission line right-of-way.

Midpoint to Malin

Most of this 391-mile-long route is composed of a mixture of shrublands and grasslands interspersed with juniper. Montane coniferous forests are found both east and west of Lakeview. This entire area is commonly known as the "high desert" and/or the "cold desert." Bailey (1936) classifies this area as the "Upper Sonoran Life Zone."

Game species commonly found within the area that would be crossed by the proposed route include mule deer, antelope, chukar partridges, mourning doves, sage grouse, Hungarian partridges, mountain and California quail, and ducks and geese in the scattered wetlands. Other mammals include the coyote, badger, bobcat, big brown bat and packrat. Non-game birds are typified by the magpie, golden eagle, prairie falcon and sage sparrow.

TABLE II-13

BIRDS COMMON TO THE PROPOSED RIGHT-OF-WAY

Common Name	Family Name	No. of Species	Common Name	Family Name	No. of Species
Loons	Gaviidae	2	Kingfishers	Alceninidae	1
Grebes	Podicipedidae	5	Woodpeckers	Picidae	12
Pelicans	Pelecanidae	1	Tyron and Flycatchers	Tyrannidae	12
Cormorants	Phalacrocoracidae	1	Larks	Alandidae	1
Herons and Bitterns	Ardeidae	7	Swallows	Hirundinidae	7
Ibises	Threskiornithidae	1	Jays, Magpies and Crows	Corvidae	8
Swans, Geese and Ducks	Anatidae	32	Titmice, Verdins, Bushtits	Paridae	5
Vultures	Cathartidae	1	Nuthatches	Sittidae	3
Hawks, Harriers and Eagles	Accipitridae	10	Creepers	Cethiidae	1
Osprey	Pandionidae	1	Wrentits	Chamaeidae	1
Falcons	Falconidae	3	Dipper	Cinclidae	1
Grouse	Tetraonidae	4	Wrens	Troglodytidae	6
Quails, Partridges and Pheasants	Phasianidae	6	Mockingbirds and Thrashers	Mimidae	3
Cranes	Gruidae	1	Thrushes, Bluebirds and Solitaires	Turdidae	8
Rails, Gallimules and Coots	Rallidae	3	Kinglets	Sylviidae	2
Plovers	Charadriidae	4	Pipits	Motacillidae	1
			Waxwings	Bombycillidae	2
Snipes, Sandpipers, etc.	Scolopacidae	17	Shrikes	Laniidae	2

TABLE II-13 (Cont.)

Common Name	Family Name	No. of Species	Common Name	Family Name	No. of Species
Avocets and Stilts	Recurvirostridae	2	Starlings	Sturnidae	1
Phalaropes	Phalaropodidae	3	Vireos	Vireonidae	3
Gulls and Terns	Laridae	8	Wood Warblers	Parulidae	15
Pigeons and Doves	Columbidae	3	Weaver Finches	Ploccidae	1
Owls	Tytonidae and Strigidae	13	Meadowlarks, Blackbirds & Orioles	Icteridae	8
Goatsuckers	Caprimulgidae	2	Tanagers	Thraupidae	1
Swifts	Apadidae	2	Grosbeaks, Finches, Sparrows and Buntings	Fringillidae	35
Hummingbirds	Trochilidae	4			

TABLE II-14

FISH COMMON TO THE AREA OF THE PROPOSED RIGHT-OF-WAY

Common Name	Family Name	No. of Species
Lampreys	Petromyzontidae	2
Sturgeon	Acipenseridae	1
Trout and Whitefish	Salmonidae	13
Suckers	Catostonidae	8
Minnows, Chubs, Dace	Cyprinidae	11
Catfish	Ictaluridae	5
Mosquito Fish	Peociliidae	1
Crappie, Bluegills, Bass	Centrarchidae	7
Perch	Percidae	1
Scalpins	Cottidae	6

TABLE II-15

AMPHIBIANS AND REPTILES COMMON TO THE AREA OF THE PROPOSED RIGHT-OF-WAY

Common Name	Family Name	No. of Species
Salamanders	Ambystomatidae	8
Newts	Salamandridae	2
Ensantinas & Painted Salamanders	Plethodontidae	5
Tailed Frog	Ascaphidae	1
Spadefoot Toad	Pelobatidae	1
Western Toad	Bufonidae	2
Treefrog	Hylidae	1
True Frogs	Ranidae	6
Turtles	Testudinidae	2
Lizards	Iguanidae	12
Skinks	Scincidae	2
Whiptails	Teiidae	2
Alligator Lizards	Anguidae	2
Boas	Boidae	2
Snakes	Colubridae	26
Vipers	Viperidae	3

Typical amphibians and reptiles include the spadefoot toad, desert horned lizard and plains rattlesnake.

Insects include the harvester ant, Rocky Mountain woodtick and Carolina grasshopper.

The sagebrush webworm (Aroga websterii), is found throughout the desert area where sagebrush is common, and has killed thousands of acres of sagebrush by defoliation. The high desert area along the proposed route is highly important deer winter range for approximately 18,000 mule deer, and year-round range for 3,400 antelope, 200 bighorn sheep and 30 Rocky Mountain elk (Grogan, Masson, Rath, 1974 personal communications).

This high desert is also home to many important birds, including the golden eagle, prairie falcon and the ferruginous hawk. Some bald eagles nest and winter along the Snake River, however, populations are not known. (Bertrand and Scott, 1971).

Wildlife habitat requirements vary greatly by species. Many species require solitude and seclusion as well as the food, water and cover required by all wildlife. Most predatory species, including the raptorial birds and some small non-game species fall into this category.

In desert areas, of course, water is often the crucial factor, followed by protective cover against sun and wind and forage available above and below the prevailing winter snows.

The condition of the big game range in the area that would be crossed by the proposed right-of-way is the result of overgrazing of grasses by cattle, sheep and horses which permitted invasion by shrubs and junipers. Brush species provide more food and shelter for some species than grass habitat. A mixture of grasses and brush provides the best habitat for most wildlife species. There is still competition between livestock and deer on some parts of the range.

Most desert wildlife relies on vegetative succulence for water. Some must rely on springs, seeps, reservoirs or natural lakes and ponds. Antelope, mule deer, most mammalian predators and birds require free water on occasion. Reservoirs and ponds of clean water are essential to the many thousands of waterfowl, shorebirds and other bird life that inhabit the marshes of southern Idaho and southeastern and southcentral Oregon. Riparian vegetation is limited along the proposed route. It is of extreme importance to terrestrial wildlife species for forage, nesting, and escape cover. It is also critical for water temperature control, cover, and food supplies required by aquatic wildlife.

Cold-water game fish require high quality water with temperatures below 70^{o}F. to maintain healthy populations. Cold-water species, including the unique red-banded trout, are most numerous in streams and lakes of the coniferous forest, but occur throughout the area that would be crossed by the proposed route, where habitat is suitable.

Some resident trout, kokanee, whitefish, mullet and lampreys exhibit seasonal intra-stream migrations for spawning in many stream and lake systems.

Young trout and salmon are primarily insect feeders. As they mature they eat a greater variety of organisms, including crustaceans and terrestrial insects that fall into streams. Mature individuals, especially lake, Dolly Varden and brown trout, become quite predaceous on small fish. An abundant population of salmonid species is therefore dependent upon a healthy food chain consisting of many small animals that feed on aquatic plants. That food chain is, in turn, dependent upon good quality water and habitat conditions. Spawning and incubation occurs mainly during the period of April through June for most rainbow trout species. Brook and brown trout usually spawn in the fall from September through December.

Warm-water game fish, including bass, sunfish, catfish, crappie and perch, were introduced into waters of the area that would be crossed by the proposed right-of-way. Spawning and egg incubation normally occurs from May through July. (Bell, 1973)

These species require warmer water temperatures (75° - 85°F.) than trout for reproduction. They are also more tolerant of adverse habitat conditions such as lower dissolved oxygen concentrations and increased turbidity. They are more prolific than cold-water species and usually cause fishery management problems when introduced into waters managed for trout or salmon. However, these species provide recreation in some waters unsuited for cold-water fishes, because they thrive in a wide range of habitat conditions and degraded waters.

Non-game fish including suckers, dace, sculpins, squawfish, carp, chiselmouth, chubs (roach) and some lampreys are important in the food chain as forage fish. Bond (1974) believes the shortnose sucker, found in Klamath Lake and the Lost River system, and the Warner sucker, Warner Valley lakes, to be endangered. Species along the proposed route he classifies as rare are the alvord chub (Alvord Basin area) and California roach (Goose Lake). The red-banded trout, a unique hybrid form, may occur in streams crossed by the right-of-way. (U.S.F.W.S. 1976)

Anadromous fish such as salmon, steelhead, cutthroat trout, sturgeon, shad, smelt and lamprey have essentially the same habitat requirements as cold water game fish. They have the additional requirements, however, of access to and from the sea. However, there are no anadromous fish along the proposed power line route from Midpoint to Malin, and only the possibility of anadromous fish from Malin to Medford.

The following discussion describes major habitat types that would be crossed by Pacific's proposed Midpoint to Malin 500 KV electric transmission line right-of-way.

The desert shrub habitat type predominates in southern Idaho and Oregon. It comprises 66 percent of the total ground cover for many species of wildlife.

Shrubs vary from 6-foot-high big sagebrush on productive soils to 6-inch-high low or black sage on poorer sites.

TABLE II-16 identifies some wildlife species typical of desert shrub habitat that would be crossed by the proposed right-of-way.

In combination with juniper, desert shrub forms most of the crucial deer winter ranges in the area that would be crossed by the proposed right-of-way (FIGURE II-10). Probably 90 percent of all of the wintering deer along the route will be found in the shrub-juniper assocation. Some are found in shrublands throughout the year.

The desert shrub vegetative type is also important as habitat for the threatened kit fox, and as hunting areas for eagles and other raptors. The Snake River Plains of southern Idaho is one of North America's most significant wintering area for birds of prey. (FIGURE II-11)

TABLE II-16

WILDLIFE TYPICAL OF DESERT SHRUB HABITAT

Mammals	Birds[1/]	Amphibians & Reptiles
Mule Deer (winter)	Sage Grouse	Leopard Lizard
Antelope	Bluebird	Sagebrush Lizard
Coyote	Northern Shrike	Desert Whipsnake
California Bighorned Sheep	Sage Sparrow	
Pigmy Rabbit	Golden Eagle	
Merriam's Shrew		
N. Grasshopper Mouse		
Desert Wood Rat		
Kit Fox		

1/ Trimble, S. BLM Tech note, TN 269 "Non-Game Birds of the West, An Annotated Bibliography," has a more detailed list of birds by vegetative type.

Sagelands also constitute the principal nesting and wintering habitat for sage grouse, and antelope wintering and fawning areas. The California bighorn sheep (Ovis canadensis) is also found in this type in areas of rimrocks and inaccessible cliffs. Once extinct in Oregon, these animals have been brought back to the Owyhee River, Steens and Hart Mountains areas in Oregon and transplanted in the Owyhee Mountains of Idaho. Occasional bighorn sheep are also seen in the Warner Mountains just east of Lakeview. Approximately 200 California bighorns inhabit the general area that would be crossed by the proposed right-of-way. (Idaho and Oregon Wildlife Agencies).

The juniper habitat type comprises approximately 10 percent of the total ground cover along the proposed right-of-way. It is extremely important because it provides needed cover and food for deer and other wildlife. Typical juniper habitat is located in the Owyhee, Malheur, and Klamath Rivers, along the Warner Valley and Silver Lake rims.

FIGURE II-10
Typical Deer Winter Cover

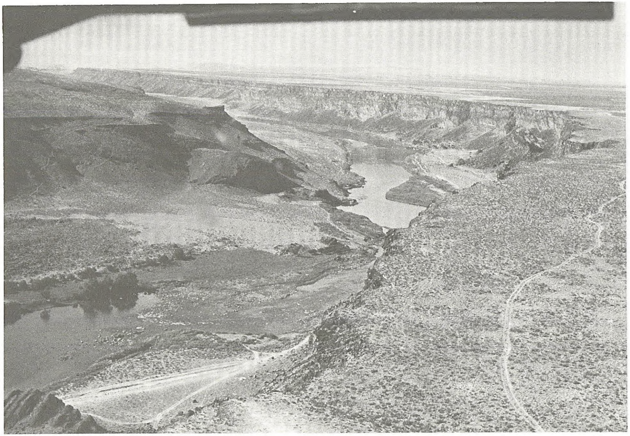


FIGURE II-11
Snake River - Birds of Prey Wintering Area

TABLE II-17 identifies some wildlife species typical of juniper habitat that would be crossed by Pacific's proposed right-of-way.

TABLE II-17

WILDLIFE TYPICAL OF JUNIPER HABITAT

Mammals	Birds	Amphibians & Reptiles
Mule Deer	Red-shafted Flicker	Eastern Long-Toed Salamander
Bobcat	Ash-throated Fly-catcher	Collard Lizard
Mountain Cottontail	Magpie	
Canyon Mouse	Townsend Solitare	
Squirrels	Chipping Sparrow	
Bats		

The juniper vegetative type is very important for deer winter cover. Oils in the foliage do not permit extensive browsing. However, deer will forage on juniper under severe winter conditions.

Juniper is also important to such species as woodpeckers, squirrels and bats that require cavities for nesting and denning sites.

The grasslands habitat type constitutes a small part of the semi-desert lands in the area that would be crossed by the proposed right-of-way. Artificial grasslands have been created by plowing, burning and chaining native shrub vegetation and reseeding - predominantly crested wheat grass. Native meadow grasslands are rare and interspersed in shrublands, juniper or coniferous forests.

TABLE II-18 identifies some wildlife species typical of grass habitat that would be crossed by the proposed right-of-way.

Grassland wildlife species include many of the small seed eating and seed "harvesting" burrowing mammals such as ground squirrels and pocket gophers which need well-drained soils. They, in turn, encourage the presence of badgers and other members of the weasel family and a host of predatory hawks and owls.

Burrowing predators and prey species sometimes develop strange associations. Rattlesnakes, burrowing owls and some of the ground squirrels may simultaneously occupy the same burrow system.

Most of the birds are ground nesters. The introducted chukar partridge is an example of an adaptable grassland dweller who nests on the ground and eats the seeds of such grasses as cheat grass and other bromes.

The montane coniferous forest habitat type that would be crossed by Pacific's proposed Midpoint to Malin right-of-way is found only in the areas east and west of Lakeview, Oregon.

TABLE II-18

WILDLIFE TYPICAL OF GRASS HABITAT

Mammals	Birds	Amphibians & Reptiles
Antelope Ground Squirrel	Ferruginous Hawk	Great Basin Spade-foot Toad
Belding Ground Squirrel	Long-Billed Curlew	Desert Horned Lizard
Northern Pocket Gopher	Burrowing Owl	Great Basin Skink
Heather Vole	Common Nighthawk	Great Basin Rattle-snake
Pacific Jumping Mouse	Horned Lark	
Badgers	Western Meadowlark	
	Grasshopper Sparrow	
	Chukar Partridge	

TABLE II-19 identifies some wildlife species typical of montane coniferous forest habitat in the area that would be crossed by the proposed route.

TABLE II-19

WILDLIFE TYPICAL OF MONTANE CONIFEROUS HABITAT

Mammals	Birds	Amphibians & Reptiles
Coyote	Rocky Mountain Pigmy Owl	Pacific Tree Frog
Black Bear	Steller's Jay	Valley Gartersnake
Martin	Hairy Woodpecker	
Marmot	Clarks Nutcracker	
Big Brown Bat	Redtailed Hawk	
Snowshoe Hare	Mountain Chickadee	

Bear, cougar and martin are typical forest-dwelling predators that require the seclusion and prey species afforded by these timberlands. Woodpeckers require large dead pines for nesting sites and rotting trees for their food supply of grubs and other insects.

These woodlands are important summer deer habitat, providing shade, forage, water and escape cover during hunting seasons. Bald eagles and osprey use large trees and snags adjacent to water for nesting and rearing their young.

Much of this area is undergoing intensive logging and thinning. This practice can deny habitat to some species and create new habitat for others.

Wetland and aquatic habitat crucial to waterfowl and other birds, mammals, reptiles, amphibians and fish are interspersed throughout the high desert shrub, juniper and grasslands in the area that would be crossed by Pacific's proposed electric power transmission right-of-way.

These include large marshlands such as the Malheur and Lower Klamath National Wildlife Refuges, Warner Valley, large marshes adjacent to the Snake, Bruneau and Klamath Rivers, and numerous small pot-holes, reservoirs and streams with riparian and aquatic vegetation.

TABLES II-20 and 21 identify some wildlife species typical of wetland and aquatic habitats in the area that would be crossed by the proposed right-of-way (U.S.D.I., 1973) (12), (U.S.D.I., 1974) (5).

Major waterfowl concentrations occur along the Snake River, Klamath and Warner Valley Lakes. (FIGURE II-12) These waters serve as habitat for resident species and provide food and resting areas for the many migrants moving north and south through the area east of the Cascade Mountains.

In addition to water these birds require a variety of aquatic and riparian vegetation - submergent, emergent and floating, for nesting, escape cover and feeding.

Wetland and aquatic habitats are also important to myriad shore and marsh birds, fur-bearing mammals, snakes, amphibians, hundreds of insect species important in innumerable food chains and many strictly terrestrial birds and mammals that prey on wetland and aquatic creatures.

In Idaho, for example, 55 golden eagle eyries have been recorded along the Snake River between Lower Salmon Falls Dam near Hagerman and Marsing, Idaho.

Oliver (1967) states that any water course is the hub of upland bird range. His studies, for example, show that 56 percent of Washington pheasants live on 3 percent of the total habitat.

Drainage, pollution, over-grazing, reclamation and other factors have seriously reduced and/or degraded many acres of formerly valuable wetlands and aquatic habitat.

TABLE II-20

WILDLIFE TYPICAL OF WETLAND AQUATIC HABITATS

Mammals	Amphibians & Reptiles	Fish		Insects
Mink	Ringnecked Snake	Rainbow Trout (resident)	Speckled Dace	Mayflies - <u>Ephemoptera</u>
Muskrat	Garter Snake	Mountain Whitefish	Tui Chub	Dragonflies - <u>Odonota</u>
Otter	Bullfrog	Brook Trout	Largemouth Bass	Stoneflies - <u>Plecoptera</u>
Beaver		Lahontan Cutthroat Trout	Smallmouth Bass	Caddisflies - <u>Trichoptera</u>
	Spotted Frog	Yellowstone Cutthroat Trout	White Crappie	Mosquito - <u>Diptera</u>
Vagrant Shrew	Southern Long-tailed Salamander	Mountain Sucker	Black Crappie	
Long-tailed Weasel		Pacific Lamprey	Bluegill	
Raccoon		Largescale Sucker	Channel Catfish	
Striped Skunk		Carp	Black Bullhead	
		Northern Squawfish	Tadpole Madtom	
		Redside Shiner	Brown Bullhead	
			Yellow Perch	

TABLE II-21

BIRDS TYPICAL OF WETLAND AQUATIC HABITAT

Marsh Hawk	Blue Winged Teal	Sora	Herring Gull
Cooper's Hawk	Cinnamon Teal	Common Snipe	California Gull
Western Grebe	Widgeon	Long-billed Curlew	Franklin's Gull
Horned Grebe	Shoeveler	Spotted Sandpiper	Forster's Tern
Pied-billed Grebe	Wood Duck	Willet	Black Tern
Great Blue Heron	Redhead	Greater Yellowlegs	
Black-crowned Night Heron	Ring-necked Duck	Lesser Yellowlegs	Shorteared Owl
Common Egret	Goldeneye	Short-billed Dowitcher	Great Horned Owl
Great Bittern	Bufflehead	Long-billed Dowitcher	Downy Woodpecker
Mallard	Ruddy Duck	American Avocet	Violet-green Swallow
Gadwall	Common Merganser	Black-necked Stilt	Bank Swallow
Pintail	Hooded Merganser	Wilson's Phalarope	Long-billed Marsh Wren
Green Winged Teal	Sandhill Crane	Ring-billed Gull	Yellow-headed Blackbird
		American Coot	Red-winged Blackbird
		White Pelican	Lark Sparrow

FIGURE II-12
Waterfowl Concentration Typical of Klamath Refuge

Agricultural habitats are scattered across the high desert lands that would be crossed by the proposed right-of-way. These habitats are principally composed of irrigated alfalfa and grain and extensive row-croplands near the Snake and Bruneau Rivers in Idaho, and in the vicinity of Lakeview and Klamath Falls in Oregon. Wildlife make extensive use of these agricultural lands and adjacent brush and grasslands.

TABLE II-22 identifies some wildlife species typical of agricultural habitats in the area that would be crossed by the proposed right-of-way.

Migrating and wintering waterfowl often graze on young spring plant growth and use waste grains found in wheat, corn, barley and oat fields. Waterfowl make extensive use of seasonally flooded agricultural lands in the Klamath Basin. Major upland game species including pheasants, quail, Hungarian and chukar partridges are often found on and adjacent to agricultural lands. Many fur-bearers and other small mammals live adjacent to agricultural lands to forage on crops or to prey upon those species that do. Deer forage on alfalfa and other croplands at night, hiding in adjoining brush and timberlands during the day.

Recent clean farming practices including intensive cultivation, silage conversion, clean farming, leveling, single cropping and other practices have reduced wildlife use of agricultural lands in many areas. The remaining reduced habitat becomes even more valuable to many wildlife species.

The following discussion describes by route segment the specific wildlife habitats that would be crossed by or which lie adjacent to Pacific's proposed Midpoint to Malin electric power transmission line right-of-way.

Midpoint to Hagerman Segment

West from the Midpoint Substation the proposed route would pass between two winter ranges for approximately 100 antelope and a burrowing owl nesting site southwest of Shoshone. The Hagerman area is important for wildlife. A small State wildlife refuge draws birds from flights up and down the Snake River. There are at least three golden eagle pairs nesting in the immediate vicinity of Hagerman. (FIGURE II-13) This section of the river has year-round waterfowl use and is an important migration route. (Nelson, 1974).

The threatened (in Idaho) white sturgeon is found in this portion of the Snake River. Other fish include the German-brown trout and Dolly Varden, rainbow and cutthroat trout, smallmouth and largemouth bass, channel and bullhead catfish, carp, squawfish, white crappie, bluegill, dace and shines. There are no anadromous fish in the upper Snake River (U.S.D.I., 1975) (2).

Hargerman to Owyhee Junction Segment

From Hagerman to the Bruneau River, the proposed right-of-way would run parallel and about 6 miles to the south of the Snake River. Near the Saylor Creek Air Force Range, the route would pass along the north border of approximately four townships ranged by a band of 37 wild horses.

TABLE II-22

WILDLIFE TYPICAL OF AGRICULTURAL HABITAT

Mammals	Birds	Amphibians & Reptiles
Striped Skunk	Sharp-shinned Hawk	Western Toad
Raccoon	Rough-legged Hawk	Western Fence Lizard
Belding Ground Squirrel	American Kestrel	Great Basin Rattle-snake
Nuttall's Cottontail	Bobwhite	Common Garter Snake
Yellow-bellied Marmot	California Quail	
Townsend's Pocket Gopher	Ring-necked Pheasant	
Ord's Kangaroo Rat	Hungarian or Gray Partridge	
Deer Mouse		
Western Harvest Mouse	Mourning Dove	
Badger	House Sparrow	
Mule Deer	Common Crow	
	Killdeer	
	Barn Owl	
	Burrowing Owl	
	Short-eared Owl	
	Common Nighthawk	
	Rock Dove (Pigeon)	
	Western Meadowlark	
	Barn Swallow	

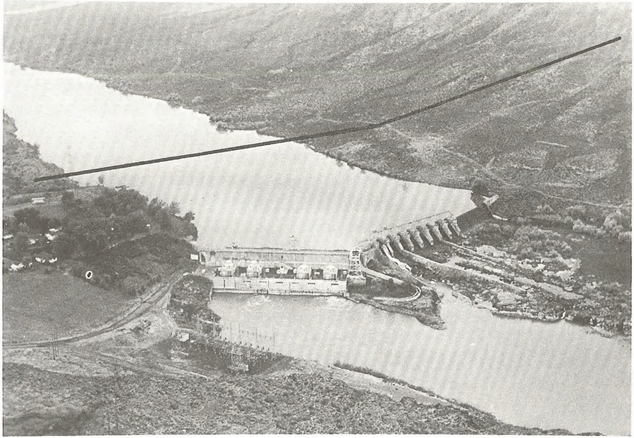


FIGURE II-13
Lower Salmon Falls Dam Near Hagerman
(existing powerline tower left center)
Proposed Crossing ________

The Bruneau Valley and adjacent Strike Reservoir is used by thousands of waterfowl and hundreds of upland game birds. (FIGURE II-14) (Personal cnum. with Wm. Webb, I.D.G., and BLM personnel, Boise, Idaho)

The leopard dace (Rhinichthys falcatus), classed as "rare" in Idaho, is found in the Bruneau River. Other fish are similar to those in Snake River.

On the east approaches to the Owyhee Mountains, the proposed right-of-way would run adjacent to a mule deer winter range and a year-long range for 90 antelope and approximately 75 bighorn sheep. There are also several golden eagle nests in that general area.

Crossing the Owyhee Mountains, the proposed right-of-way would pass between two small elk range used by approximately 30 animals, and an area used by about 250 antelope. It would also border an important interstate winter range used by about 1,000 deer that summer in Idaho and winter in Oregon along the breaks of the three forks of the Owyhee River.

During the 1974 aerial big game census, 22 golden eagles were counted in the area south of the proposed right-of-way. The winter census counted 850 deer in Idaho's big game units 40 and 41, (I.F.&G., 1973) which are located on either side of where the proposed route would pass through the Owyhee Mountains.

Owyhee Junction to Catlow Junction Segment

From Owyhee Junction to Catlow Junction, the proposed right-of-way would pass areas used by 6 antelope herds totaling approximately 640 animals, (FIGURE II-15), 2 deer winter ranges (number of animals unknown) in the Steens and Pueblo Mountains, and the Steens Mountain bighorn sheep range inhabited by approximately 100 bighorns.

There is a concentration of sandhill cranes along the west slope of the Steens on the edge of Catlow Valley. The rare Alvord Chub is found in the Alvord Lake area and several springs and wells including Hot or Borax Lake. Borax Lake is heavily charged with minerals and the surface temperature is close to 95°F. No other fish in Oregon lives under such difficult conditions. (Bond, 1973). Fish in the Owyhee River include rainbow and cutthroat trout, mountain whitefish, squawfish, carp, suckers, black and brown bullhead, channel catfish, perch and sculpino.

The area that would be crossed by Pacific's proposed 500 KV transmission line right-of-way is extremely important to large numbers of many species of wildlife.

Catlow Junction to Malin Segment

The proposed right-of-way would pass 4 antelope ranges used by approximately 1500 animals. Both deer and antelope have year around range in the Beattys Butte area. There are also about 700 wild horses in that area. An important antelope herd area is located at the south end of Hart Mountain in the Jacob's Reservoir area and another near Sagehen Butte. The proposed route would pass through the Jacob's Reservoir fawning area used by approximately 250 antelope (FIGURE II-16). A herd of about 760 wild horses is in the Beatys Butte area, which is also important deer and antelope habitat.

FIGURE II-14
Bruneau Valley
(Strike Reservoir in background)

FIGURE II-15
Typical Antelope Habitat - Southeast Oregon

FIGURE II-16
Typical Antelope Fawning Area

The proposed route from Fish Creek Rim (west of Warner Valley) to the Fremont Forest boundary goes through the center of one of the best sage grouse strutting grounds and concentrations in Oregon. In addition, Hart Mountain Antelope Refuge personnel estimated 1,500 sagegrouse were on the refuge in 1974.

The well-known Drake's Flat antelope herd is found immediately west of Warner Valley along the proposed route. Probably the most important feature of this segment lies from Warner Valley to Malin because Warner Valley and the immediate adjacent Hart Mountain Antelope Refuge are nationally recognized for their importance to wildlife. TABLE II-23 illustrates the species and numbers of birds utilizing this area from 1970 through 1974. (PP&L ENV. ASS., 1975).

TABLE II-23

BIRD UTILIZATION OF WARNER LAKES AREA 1/

Year	Total	Swans	Geese	Ducks	Coots
1974	103,558	8	4,200	59,350	40,000
1972	28,055	205	12,800	13,050	2,000
1971	37,860	0	2,760	33,600	1,500
1970	106,325	3,800	6,425	36,100	60,000

Source: Fish & Wildlife Service, Lakeview, Oregon
1/ Numbers indicate total individuals (PP&L Env. Ass., 1975)

The Warner Lakes in Warner Valley are a major nesting and feeding area in the Pacific Flyway and undergo the greatest seasonal bird use of any area along the proposed Midpoint to Malin right-of-way. This area is also an important rookery for herons and cormorants. Some 200,000 migrating birds are believed to pass through the Warner Valley area annually.

Pelican Lake and Crump Lake, just south of the area that would be crossed by the proposed right-of-way, contains one of the two unique White pelican rookeries in Oregon. (Carter and Elefant, personal communication). The valley is an important migration flyway for ducks, geese, swans, sandhill cranes and many other waterfowl and marsh birds. (FIGURE II-17)

Pacific's proposed right-of-way would pass immediately adjacent to Hart Mountain National Antelope Refuge where 213 bird species, including 63 important marsh and shore birds have been recorded (U.S.D.I. 1972). Warner Valley rims are important nesting areas for eagles and prairie falcons. The endangered Peregrine Falcon has been seen in the Valley. The Warner Sucker, believed to be a threatened species in Oregon, is found only in streams flowing into south Warner Valley. There are known bald eagle nests near the proposed route just west of Goose Lake Valley. The route would be in proximity of three reservoirs used for waterfowl nesting: Lower Cottonwood, Little Muddy and Girtles.

FIGURE II-17
Narrows and Hart Lake
Proposed Powerline Route

Near Lakeview the proposed right-of-way would pass two mule deer winter ranges located on either side of the Goose Lake Valley. As it nears the California state line and turns west toward Malin, the proposed right-of-way would pass through the area used by the Devil's Garden Interstate Deer Herd as a migration route, which has ranged from over 16,000 animals (by track count) in 1964 to a low of approximately 4,000 deer over the past few years, (OWC, 1974). (FIGURE II-18)

Most of these deer winter near the Oregon - California state line. This deer herd is one of the most intensively studied in the country. As the herd summers in Oregon and winters in California, it has been managed through the interagency efforts of the Interstate Deer Herd Committee involving Oregon and California state wildlife agencies, the U.S. Forest Service and the Bureau of Land Management.

The Bryant Mountain Herd adjoins the Devil's Garden Interstate Herd to the west. This herd has declined from a high of approximately 7,000 deer in the early 1960's to an estimated 3,000 deer at present.

The South Goodlow Mountain herd use area lies northeast, and adjacent to the Bryant Mountain deer winter range.

TABLE II-24 summarizes wildlife distribution by segment of Pacific's proposed Midpoint, Idaho to Malin, Oregon 500 KV transmission line right-of-way.

Malin to Medford

This 92-mile-long section of Pacific's proposed right-of-way would traverse extremely important and diverse wildlife habitats including coniferous forest, broad sclerophyll, wetland and aquatic habitats and mixed juniper-shrub-grasslands.

South of Klamath Falls, Oregon, the proposed right-of-way would cross the Klamath Basin, site of one of the world's greatest waterfowl concentrations. The combination of close proximity to open water, marshlands, grainfields, and federal and state refuges makes the basin a waterfowl habitat that is unexcelled. The route would skirt part of the Klamath Basin National Wildlife Refuge and pass through the largest blacktailed deer migration route in western Oregon.

More than 370 species of terrestrial wildlife and 39 species of fish live in the general area that would be crossed by the proposed right-of-way. These include both mule and blacktailed deer, a few Roosevelt elk and approximately 250 species of waterfowl and shore birds.

The following discussion describes each major habitat type that would be crossed by Pacific's proposed Malin to Medford 500 KV electric transmission line right-of-way.

The montane coniferous forest habitat type comprises approximately 51 percent of the total ground cover of the Malin to Medford area that would be crossed by the proposed right-of-way.

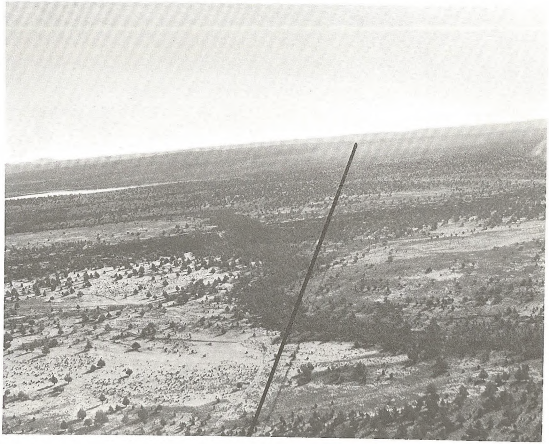


FIGURE II-18
Devil's Garden Interstate Deer Herd Migration Area
Proposed Powerline Route ——

TABLE II-24

SUMMARY WILDLIFE DISTRIBUTION MIDPOINT TO MALIN

Major Species	Midpoint to Hagerman	Hagerman to Owyhee Jct.	Owyhee Jct. to Catlow Jct.	Catlow Jct. to Malin	Total
Fish	1-	3-	2-		
Deer		3-1500	1-500	5-16,000	8-18,000
Antelope	1-100	5-600	4-500	7-220	17-3400
Bighorn Sheep		1-100	1-100		2-200
Elk		2-30			2-30
Waterfowl	2-	2-	1-	4-1,000,000	9-
Raptors	1-	1-	2-	1-	5-
Threatened or Endangered	6-Spotted Bat Peregrine Falcon Prairie Falcon W. Ground Snake W. Snowy Plover Bald Eagle	7-Spotted Bat Prairie Falcon Peregrine Falcon W. Ground Snake W. Snowy Plover Bald Eagle Kit Fox	5-Kit Fox Prairie Falcon Peregrine Falcon W. Ground Snake W. Snowy Plover	5-Kit Fox Prairie Falcon Peregrine Falcon Warner Sucker Shortnose Sucker Bald Eagle	
Sagegrouse Strutting		1-	1-	1-	3-
Wild Horses		1-40			1-40

Shown by number of concentrations or herds and by estimated population as possible. See actual overlays and maps for details. For example, "4-600" indicates 4 bands of antelope, etc. for a total of 600 individual animals.

TABLE II-25 identifies some wildlife species typical of the montane coniferous forest habitat that would be crossed by the proposed right-of-way.

Other less typical wildlife species, such as the rare black salamander, are found in the montane forest.

On the east slopes of the Cascade Mountains the Roosevelt elk and Rocky Mountain elk have intermingled until it is difficult to differentiate between the two sub-species (Oregon Game Commission "Bulletin," July 1972).

Parts of this zone may have concentrations of black-tailed and mule deer. The Douglas ground squirrel is common in the mixed forests of this area as is the Northern Pacific rattlesnake. Destructive insects such as the bark beetle infest ponderosa pine.

Forest wildlife is generally adapted to a canopy of coniferous timber interspersed with small openings. Some species, including the herbivors such as deer and elk, respond favorably to an edge effect created by forest meadows, logging, or fires that allow development of a nutritious understory vegetation.

Other species, including raptors and larger predators, may respond adversely to loss of the timber overstory, especially if it is accompanied by human activity. Accipter hawks and the northern spotted owls depend on tree-dwelling mammals for their prey, such as the red-backed mouse, red and flying squirrels and the small birds found in forested areas. (U.S.D.I., 1972) (8).

Lakes and streams within this habitat type often contain many of the valuable salmonoids such as rainbow, brook trout and kokanee salmon, as well as many of the spiney-rayed bass, bluegills and crappie.

The broad sclerophyll habitat adjacent to the Siskiyou and Cascade mountains contains many important wildlife species more closely related to California than to Rocky Mountain species.

TABLE II-26 lists some wildlife species typical of the broad sclerophyll habitat that would be crossed by Pacific's proposed right-of-way.

Some wildlife found along the fringes of the Rogue River Valley are similar to central Oregon brushland species, e.g., magpie, American Kestrel and black-tailed jack rabbit.

The broad sclerophyll habitat type generally occurs on the higher foothill areas bordering the montane forest of the Cascade and Siskiyou Mountains, extending south along the California-Oregon line.

Wildlife are dependent on the great variety of transition-zone hardwood trees and shrubs. Acorns provide food for tree and ground squirrels, certain woodpeckers and woodducks and are readily used by black-tailed deer in the fall and winter. Ceanothus, manzanita, scrub oak, and mountain mahogany are preferred browse species for wintering deer. The Pokegama - Jenny Creek area on the California border provides winter range for the largest migrating blacktailed deer herd in Oregon.

TABLE II-25

WILDLIFE TYPICAL OF MONTANE CONIFEROUS FOREST MALIN TO MEDFORD

Mammals	Birds	Amphibians & Reptiles	Insects
Roosevelt Elk	Golden Eagle	Pacific Tree Frog	Oregon Rain Beetle
Mule and Blacktailed Deer	Barrows' Golden eye	California Mountain Kingsnake	
Golden-mantled Ground Squirrel	Great Gray Owl		Bark Beetle
Cougar	Gray Jay	Northern Pacific Rattlesnake	
Black Bear	Northern Spotted Owl		
Pika	Red-tailed Hawk		
Oregon Snowshoe Hare	Clark's Nutcracker		
Big Brown Bat	Mountain Quail		

This sub-biome can become very hot and water can be a major limiting factor. Many small streams and ponds go dry during the summer. Some brush-fields in the broad sclerophyll type - especially those following wildfires, become too dense and stagnant to provide good wildlife habitat.

In other areas, continuing road development, powerline rights-of-way, brush cutting for pasture development and suburbanization of southwestern Oregon is rapidly eliminating much of the former scrubtrees and associated brush species around the Rogue Valley. With the loss of this cover, many of the indigenous wildlife species lose their habitat.

Juniper-brush-grassland habitat types are well integrated in most areas along much of the area that would be crossed by the proposed right-of-way. Brush and grasslands are found principally along the edges of the Rogue Valley, along the California-Oregon border and in the east foothills of the Cascades where they merge into the Klamath Basin toward Malin.

TABLE II-26

WILDLIFE TYPICAL OF BROAD SCLEROPHYLL HABITAT

Mammals	Birds	Amphibians & Reptiles
Dusky Footed Woodrat	California Quail	Sharp-tailed Snake
Oregon Gray Fox	Scrub Jay	Leopard Salamander
Pacific Pale Bat	Rufus-sided Towhee	
Blacktailed Deer	Red-shafted Flicker	
	Acorn Woodpecker	

TABLE II-27 identifies some wildlife typical of the juniper-brush-grassland habitats that would be crossed by Pacific's proposed Malin to Medford right-of-way.

The juniper, mahogany, and some bitterbrush found in these areas form valuable forage for the Black-tailed and mule deer wintering at lower elevations. The Bryant Mountain mule deer herd northeast of Malin is highly dependent for winter range on these mixed habitat types. (U.S.D.I., 1974 (4). (See Midpoint to Malin for habitat requirements.)

Wildlife of the juniper-brush-grassland habitat types make use of this varied vegetation in many ways. The abundance of forage, together with some escape and winter cover, fill the requirements for both mule and blacktailed deer winter range. The dense brushlands found adjacent to the broad sclerophyll type along the Oregon-California border in the Cascade Mountains are comprised mainly of ceanothus species, manzanita and some scrub oak. In some areas, the brushfields are so dense they are almost unpenetrable and supply little food or cover to wintering deer.

TABLE II-27

WILDLIFE TYPICAL OF JUNIPER-BRUSH-GRASSLAND HABITATS MALIN TO MEDFORD

Mammals	Birds	Amphibians & Reptiles
Coyote	Golden Eagle	Desert Horned Lizard
Bobcat	Magpie	Rattlesnake
Badger	Prairie Falcon	Spadefoot Toad
Black-tailed Jackrabbit		
Packrat		

As in eastern Oregon and Idaho, invading juniper can be extremely important as winter cover and habitat for jays, magpie, hawks, owls, etc. However, a dense juniper stand can shade and drought-out other forage and cover species.

The major wetland and aquatic habitat types that would be crossed by the proposed right-of-way are located in the Klamath Basin area. They extend from the northern end of the Upper Klamath Lake north of Klamath Falls south into northern California. The southern portion of this area includes three separate federal waterfowl refuges including Lower Klamath, Tule Lake and Clear Lake National Wildlife Refuges. The latter two are in northern California. The interrelationship of marshlands, open water, and adjacent farmlands make the Klamath Basin an outstanding waterfowl area for feeding, nesting, and breeding. Possible farming practices such as changing of grasslands into row-croplands will tend to concentrate waterfowl in remaining grain fields for feeding.

These, and adjacent farmlands, are part of an extremely productive waterfowl area and flyway route. The refuges list over 180 species of birds nesting in the basin. All the common dabbling and diving ducks are abundant, with pintails predominating. Geese include cackling, white-fronted, snow and Canada geese. The tiny Rosses goose, smallest of all North American geese, passes through the Klamath Basin on its annual migration. (U.S.D.I., 1969) (11). This flight represents the world population of Rosses goose (Fields, U.S.F.W.S. personal comm., 1976).

Of the thousands of waterfowl nesting on or near the refuges, the gadwall, redhead, cinnamon teal, ruddy duck, and Canada goose are the most common. Nesting colonies of white pelicans, cormorants, gulls, terns, egrets and herons are present in the area. Sandhill cranes nest in the Klamath Forest Refuge and in the Lower Klamath Refuge. Rare raptors include the white-tailed kite and the gyrfalcon. The Oregon Wildlife Commission states that the Klamath Basin has the largest concentration of nesting Bald Eagles in Oregon. The basin is also an important bald eagle wintering area.

Beaver, muskrat and mink are common within the marshlands, as are many other small mammals, song birds, amphibians and reptiles.

These wildlife species are all dependent on water to provide food and resting areas for migrant and resident populations. They also must have a variety of aquatic vegetation for nesting, feeding and escape cover. Drainage, pollution, overgrazing and reclamation have greatly reduced and degraded wetland and aquatic habitats, thereby greatly increasing the value of what remains. Insects found in these wetlands are extremely important in various aquatic and terrestrial wildlife food chains. (See Midpoint to Malin discussion for habitat requirements.)

TABLE II-28 identifies the principal fish within the area (principally Lost and Klamath Rivers and Antelope Creek) that would be crossed by Pacific's proposed Malin to Medford 500 KV transmission line right-of-way.

There have been no anadromous fish in the Klamath River (FIGURE II-19) above Copco Dam #1 below Keno, Oregon since 1918 or above Irongate Dam or Copco Reservoir in northern California since about 1960.

TABLE II-28

PRINCIPAL FISH OR AQUATIC HABITATS MALIN TO MEDFORD

Cold Water Game Fish	Warm Water Game Fish	Non-Game Fish
Mountain Whitefish	Brown Bullhead	Largescale Sucker
Brook Trout	Crappie (white and black)	Lost River Sucker
Dolly Varden	Bluegill	Carp
Resident Rainbow Trout	Largemouth Bass	Redside Shiner
*Steelhead (Antelope Creek only)	Yellow Perch	Speckled Dace
		Slender Sculpin
		Marbled Sculpin

* May not be found upstream as far as the proposed route.

The proposed right-of-way would pass along Antelope Creek which flows into Little Butte Creek and then into the Rogue River near Camp White. These streams are used by migrating salmon and steelhead (Personal communication, C.J. Campbell, Oregon Wildlife Commission, 1975).

FIGURE II-19
Klamath River Above Copco Reservoir
(Looking northwesterly - proposed powerline just
south of bottom edge of photo)

Most of the Klamath Basin is composed of agricultural habitat type adjoined by marshes and other wetlands. Much of the cropland is irrigated forage and grain crops. Grain fields flooded from November through February attract many waterfowl and greatly influence flight patterns.

Wildlife species commonly found in and adjacent to these lands are similar to those as listed for the Midpoint to Malin agricultural habitat type. Waterfowl use on standing crops and after harvest is high in agricultural habitats of the Klamath Basin since they lie between large bodies of water such as Agency and Upper Klamath Lake, Tule Lake, Clear Lake and the Klamath River.

Wildlife readily use the variety of habitat, nesting cover, water and "edge effect" created by a mixture of row crops, grainlands, irrigated alfalfa and other crops. Typical birds include the ringnecked pheasant, California quail and plover.

Burrowing animals such as moles, gophers and ground squirrels move readily into these croplands - sometimes damaging crops. The ringnecked pheasant is probably the best example of an exotic species that has flourished in the agricultural habitat type.

Many of the predators such as coyotes, badgers, mink, weasel, crows, red tailed and sparrow hawks, magpies, barn owls, gulls, etc., frequent agricultural areas and prey on the many abundant prey species.

The following discussion describes by route segment the specific wildlife habitats that would be crossed by or which lie adjacent to Pacific's proposed Malin to Medford electric power transmission line right-of-way.

Malin to Stukel Segment

From the Malin Substation the proposed right-of-way would pass west through rolling hills with sparse juniper and brush vegetation. A portion of the several thousand mule deer from Bryant Mountain winter near this area.

The proposed route would pass south of Stukel Mountain and through the low Klamath Hills and drop into the Klamath Basin. This area is also a mule deer wintering area (Personal communications, Oregon Wildlife Commission).

Stukel to Green Springs Segment

From the Klamath Hills across the Klamath basin near Worden, Oregon and on to the Klamath River the proposed route would cross important waterfowl areas. U.S. Fish & Wildlife Service data indicates more than 5 million waterfowl pass through the Klamath Basin at the peak of fall migration. (TABLE II-29) The Oregon Department of Fish & Wildlife estimates that 80% of the migrating waterfowl of the Pacific Flyway funnel through the Klamath Basin. (Kebbe, personal communication)

TABLE II-29

KLAMATH BASIN WATERFOWL USE

Swans	Ducks	Geese	Coots	Total
6,000	4,500,000	236,000	360,000	5,100,000

Grayson, 1975 - Based on U.S.D.I. 1960, 1965 & 1970 reports "Birds in Lower Klamath Region." Figures are averages for those 3 years.

In addition, an estimated 4,000 grebes, 1,000 white pelicans, 800 cormorants, 1,000 gulls and 4,000 terns migrate through this area.

A unique phenomenon in the Klamath Basin are the mass waterfowl feeding flights. A waterfowl feeding flight can be defined as one which is local in nature, relatively low in altitude and elevation, and pursued by waterfowl for the purpose of ingestion of food. A feeding flight originates at a resting area and terminates at a feeding area and vice versa. Within the Klamath Basin, by far the largest and most important feeding flight is the one that at least once in each 24-hour period traverses the flight corridor between the Lower Klamath Wildlife Refuge portion (almost all of which is lcoated in the state of California) of the Klamath Basin National Wildlife Refuges and the agricultural grain fields which lie in Southern Oregon, some five to seven miles to the north of the Lower Klamath Refuge. This feeding flight is referred to as the "Lower Klamath feeding flight." The bulk of this flight originates in the Lower Klamath Wildlife Refuge (the resting area) and terminates in the grain fields to the north (the feeding area), to the south of Midland and north of Township Road, principally in the area known as Tulana Farms. A return flight to the resting area (the Lower Klamath Wildlife Refuge) is usually made within 12 hours of the initial flight.

The Lower Klamath feeding flight numbers from a minimum of 30,000 waterfowl to a maximum of approximately 800,000 waterfowl. These numbers of birds (30,000 to 800,000) travel the feeding flight route at least once each day. This feeding flight phenomenon should not be confused with the reference to some five million plus waterfowl (Roster, 1976) that pass through the Klamath Basin at the peak of each fall's migration.

The area is heavily hunted. The Oregon Department of Fish and Wildlife estimates more than 83,000 ducks, geese and coots were harvested in the Klamath area in 1973 (Oregon Wildlife Commission, 1974) (5).

Several private gun clubs are located near the Worden area. The Oregon Wildlife Commission operates the Klamath Wildlife Management Area north of Worden for waterfowl and upland game use. South of Worden lie three Fish & Wildlife Service Klamath Basin National Wildlife Refuges. These refuges contain a total of about 116,400 acres along both sides of the California-Oregon line. The Lower Klamath Refuge lies one mile south of the proposed right-of-way. The area is mainly flat farmland with no natural obstruction to waterfowl flights.

The Fish & Wildlife Service lists 249 bird species recorded in or near these refuges (F.W.S., 1969) (11).

The Oregon Wildlife Commission also reports a harvest of over 12,000 furbearers, mostly muskrats, from Klamath County during the 1973-74 season (Oregon Wildlife Commission, 1974) (3).

The shortnosed sucker (Chasmistes brevirostris) is found in the Lost and Klamath Rivers. This fish is considered threatened in Oregon (Bond, 1974).

From the Klamath River across the Cascades and the spur of the Siskiyous east of Highway I-5, a distinct southwestern Oregon climate and wildlife type prevails. Bailey, (1936), typifies this area as a "Transition Life Zone." Along the proposed right-of-way near the California state line, the route would cross through some coniferous forest, but the area is predominantely a broad sclerophyll mixture of ceanothus, oaks, manzanita and pine.

Mammals found in this area include the Columbia blacktailed deer, Townsend's shrew, mountain beaver, western gray squirrel and the red tree vole. Amphibians and reptiles include the Northwestern salamander, rough-skinned newt, red-legged frog, yellow-bellied racer and gopher snake.

Birds include the merlin, bandtailed pigeon, great gray owl, and common flicker. A complete list would include more than 370 terrestrial wildlife and 39 fish species. (Bailey, 1936) (O.S.G.C., 1972) (Ingles, 1965).

The proposed right-of-way would cross the migration route of the Jenny Creek and Pohegama interstate blacktailed deer herd. These deer summer in the Cascade Mountains as far north as Lake of the Woods, and winter along the state line down to the Klamath River. Latest Oregon Department of Fish and Wildlife estimates place deer numbers at about 5,000 (Ebert, 1975, Personal communication).

This herd contributes heavily to the annual blacktailed deer harvest for the Keno and Rogue big game management units. Over 2,200 deer were taken in 1974 from those two units (Oregon Wildlife Commission, 1975) (1).

Near the crest of Green Springs Summit, old growth timberland along the proposed right-of-way is typical habitat for the northern spotted owl which is classified as "threatened" by the State of Oregon (O.W.C., 1974). These birds require old growth conifers for nesting and production of prey species. They are not found in more open, thinned stands or in young timber where they would be vulnerable to the great horned owl which preys on young spotted owls. Biologists believe these birds should have a minimum of 300 acres of undisturbed habitat around each known nest site.

There are four or five small bands of wild horses totaling about 20 head ranging along the Oregon-California border from the Klamath River west to Jenny Creek (see MAP B-2 in the Appendix of the Draft Statement) in the area that would be crossed by the proposed right-of-way. These horses range in common with the wintering blacktailed deer using that area. During mild winters, they will be found around Grizzly Mountain. Severe weather forces them down along the Klamath River breaks, but they are stopped from going further south by a stateline fence.

These animals are found in nearly all habitat types from coniferous forest through broad sclerophyll and mixed juniper-shrubland. They do not use marshland or agricultural habitat types, although there are some isolated mountain ranches with irrigated pastures within the horses' general territory.

Green Springs to Lookout Mountain Segment

This area of heavy timberland, as well as the timberlands in the Lookout Mountain to Medford segment could also contain spotted owls. Goshawks also use this general area. This type of habitat also contains great horned owls in more open stands. The western spotted frog is found around lakes and ponds and streams in this habitat. Some fisher and possibly wolverine could be in the area, although the 23 wolverine sightings reported since 1965 have been in the central Cascades north of the Three Sisters Mountains (Oregon Wildlife Commission, 1974) (5).

Many small non-game wildlife species including amphibians and reptiles are found in this area. Species and distribution are similar to other timbered portions of the route (U.S.D.I., 1973) (7).

Lookout Mountain to Medford Segment

This 18-mile-long route segment is composed chiefly of timberlands, although much of the lower Antelope Creek drainage contains a broad sclerophyll vegetative type, with blacktailed deer, ruffed grouse, silver grey squirrels, acorn woodpeckers and similar species. Rattlesnakes are well represented in this area. Some deer winter in this area along the foothills behind Roxy Ann Butte. (FIGURE II-20)

This portion of the proposed right-of-way would parallel Antelope Creek, which in turn flows into Little Butte Creek and the Rogue River. Anadromous fish utilize this system, although it is doubtful they get very far up Antelope Creek. Steelhead trout and perhaps some salmon may use the lower reaches. This waterway is probably more important for the water quality and quantity contribution it makes to Little Butte Creek (U.S.D.A., 1972).

Endangered and Threatened Wildlife

Midpoint to Medford

The following discussion and TABLE II-30 identifies and describes wildlife species considered endangered or threatened by federal and state governments that do or may occur within the area that would be crossed by Pacific's proposed Midpoint, Idaho to Medford, Oregon 500 KV transmission line right-of-way.

According to the Fish & Wildlife Service, an endangered species is one in danger of extinction throughout all or a significant portion of its range.

Only the American peregrine falcon, classified as endangered nationally by the Department of the Interior, is found along the route.

Although no definitive studies are available, some American peregrine falcons are known to exist in southern Idaho and Oregon. In the area of the proposed right-of-way they could be found nesting in cliffs in the major

FIGURE II-20
Deer Winter Area - Roxy Ann Butte
Proposed route about 2-3 miles to the east

TABLE II-30

THREATENED OR ENDANGERED OREGON AND IDAHO WILDLIFE

Mammals	Status	State
Spotted bat (*Euderma maculatum*)	T	Idaho & Oregon
Wolverine (*Gulo gulo*)	T	Oregon
Kit fox (*Vulpes macrotis nevadensis*)	T	Oregon
Northern Rocky Mountain wolf (*Canis lupis irremotus*)	T	Idaho
Amphibians and Reptiles		
Western spotted frog (*Rana pretiosa*)	T	Oregon
Western ground snake (*Sonora semiannulata*)	T	Idaho
Birds		
Prairie falcon (*Falco mexicanus*)	T	Idaho
American peregrine falcon (*Falco peregrinus anatum*	E*	
Northern bald eagle (*Haliaetus leucocephalus alascanus*)	T	Oregon
Western snowy plover (*Charadrius alexandrinus nivosus*	T	Oregon
Fish (See Aquatic Wildlife)		
Shortnosed sucker (*Chasmistes brevirostris*)	T	Oregon
Warner sucker (*Catostomus warnerensis*)	T	Oregon
White sturgeon (*Acipenser transmontanus*)	T	Idaho

* Classified as endangered nationally by the Department of the Interior. (U.S.D.I., 1973) (14) (I.D.F.G. 1973) (Oregon Wildlife Commission, 1974) (6)

canyons and bluffs adjacent to rivers and large bodies of water associated with the sagebrush-grass habitat type. Their principal food is other birds, and riparian habitat plays an important role in prey production. They are known to range up to nine miles from their nests in search of prey.

The Oregon Wildlife Commission states that the Arctic peregrine falcon may be a rare migrant through Oregon, however, no confirmed sightings are known (Oregon Wildlife Commission, 1975) (6).

The medium-sized northern spotted owl is principally found in the old-growth coniferous forests of western Oregon. Its habitat must contain a decadent overstory of over-mature trees for nesting and for hunting its principal prey species of northern flying squirrels, bushy-tailed wood rats and redbacked tree mice.

It is possible that only timberlands in the Medford area of the proposed route would contain spotted owl habitat. These owls are non-migratory, sedentary in their habits and are slow to move to other adjacent habitats if their nests or habitat are disrupted or destroyed.

The spotted bat is a very rare species in Idaho. There has been only one report of its presence. This specimen was collected in Moscow, Idaho. All reputable wildlife species distribution maps depict southern Idaho as having spotted bats during spring and fall migrations and summer. Little is known about spotted bats except that they prefer arid areas such as the sagebrush-grass habitat; roost in buildings and caves; feed on insects usually caught over wet areas such as springs and ponds (U.S.D.I., 1975) (2).

The prairie falcon is found throughout the area that would be crossed by the proposed right-of-way. It nests in the Snake River canyon complex where suitable nesting niches are present on cliffs. Unlike the peregrine falcon, the prairie falcon is not dependent on riparian habitat for its principal source of food. Its prey species are found in the sagebrush-grasslands habitat types, and consist principally of ground squirrels, rodents and small birds. Recent studies show that approximately 10 percent of all nesting pairs in North America occur within and adjacent to the Birds of Prey Natural Area in Idaho (U.S.D.I., 1975) (2).

The small kit fox is found in the arid, high valleys of southern Malheur, Harney and Lake counties. At least four specimens have been taken in Oregon, including one in 1972 near Klamath Falls. Ten sightings have been reported, with some as recently as 1968 and 1972. Isolated populations still exist. This species is highly susceptible to habitat alteration, predator control programs and varmint hunting. Southeastern Oregon is its northernmost range. The kit fox is classified as a protected fur bearer in Oregon (Oregon Wildlife Commission, 1974) (6).

The wolverine is found in remote areas at higher elevations of the Cascades, Blue and Steens Mountains. Most observations have been on national forest lands. Of the 32 reported sightings in Oregon, 23 have been received since 1965.

Because of the apparent dependence of the wolverine on a wilderness type habitat, this species may be threatened by a loss of habitat due to logging and intensive human activities. One aspect of protection, according to the Oregon Wildlife Commission, would be to restrict vehicle use in areas believed to be occupied by wolverines.

The Northern Rocky Mountain wolf is a subspecies of the timber wolf. It was once considered extinct--eradicated during the heyday of predator control. At one time its range included Idaho, eastern Washington and eastern Oregon, principally in the Great Basin and similar open habitat. Two or three sightings are reported from Montana, and the unlikely supposition is advanced that the subspecies may again expand into its former range.

This theory may have some credence since a wolf was killed in eastern Oregon, and one in eastern Washington during the past two years (1973 and 1974). These animals are a wilderness species and, like the grizzly, are not compatible with any great amount of human activity. It is doubtful that any of these animals occur in the area that would be crossed by the proposed right-of-way.

The redlegged western spotted frog frequents woods and meadows. It is found near cold, permanent waters including streams, lakes, marshes and springs. Since it appears to be found chiefly in the high Cascades, its presence along the proposed power line route is questionable. It has been nearly eliminated from its original range in western Oregon by the predatory bull frog (Oregon Wildlife Commission, 1974) (6).

The western ground snake is found in moist areas of the Great Basin and in western Idaho in the arid and semi-arid sagebrush-grassland habitat. It is a burrowing species feeding on spiders, centipedes, crickets and insect larva (Oregon Wildlife Commission, 1974) (6).

The northern bald eagle is found along the coast of Oregon and all principal waterways of Oregon and Idaho. Although it appears mainly as a migrant, some nesting activity occurs along the coast and large bodies of fresh water.

Bald eagles migrate and winter in the area that would be crossed by the proposed right-of-way, particularly along the Snake River. They also occur in fewer numbers in the sagebrush-grass plains area. Their principal food is fish and carrion. One bald eagle was sighted in 1974 in the Birds of Prey Natural Area. Two were observed upstream from C. J. Strike Reservoir during the same period, and 11 were sighted at the mouth of Cottonwood Canyon west of Oakley, Idaho, in 1970. Goose Lake and Warner Valleys are important bald eagle wintering areas with at least a dozen counted there each year for 1974-75. No intensive bald eagle inventories have been conducted (U.S.D.I., 1975) (2).

The western snowy plover is known to occur in the area that would be crossed by the proposed right-of-say. It is primarily found in the riparian habitat type along beaches, alkali flats and sand flats of lakes, reservoirs, rivers and ponds. It is primarily insectivorous but may utilize some vegetative matter.

Three fish species in Oregon are believed to be rare or endangered. They are the Warner sucker, the Alvord chub and the shortnosed sucker.

The Warner sucker (*Catostomus warnerensis*) is endemic to Oregon, and now found only in a few of the Warner Valley lakes and in Twenty Mile and Honey Creeks. Eggs are deposited in streams and young must spend several months in running water before descending into the lakes. They are vulnerable to loss in irrigation ditches and predation by spiney-rayed fish.

The Alvord chub (*Gila alvordensis*) is found mainly in the Alvord basin in Oregon and extreme northern Nevada. It would become endangered by introduction of predaceous fish or poisoning operations. Borax Lake is especially important to this small species.

The shortnosed sucker (*Chasmistes brevirostris*), formerly abundant in the Klamath drainage, is now reduced to a small population with some distribution in the Klamath Agency Lakes and in Lost River and Clear Lake (Bond, 1975, personal enunciation).

The Idaho Game Department believes the white sturgeon (*Acipenser transmontanus*) is endangered in parts of the Snake River system.

All of these fish occur within or immediately adjacent to areas that would be crossed by the proposed right-of-way. Population estimates are not available. None have been formally classified by the concerned states as threatened species, but are likely candidates.

ARCHAEOLOGICAL AND HISTORICAL VALUES

Known historical sites along and immediately adjacent to the proposed right-of-way are shown on the esthetic and recreation maps A-3 and B-3 in the Appendix. The sites, which relate primarily to the early settlement of southwestern Idaho and southeastern Oregon, are discussed by route segment.

The following steps were taken to discover the location of archaeological and historical sites in the area that would be crossed by the proposed right-of-way:

1. The State Historic Preservation Officers for Idaho and Oregon were contacted for information and sites eligible for or on the National Register of Historic Places.

2. The University of Oregon Museum of Natural History State archaeological file was examined for recorded sites.

3. Mr. David Cole of the University of Oregon Museum of Natural History directed a survey by helicopter of the proposed right-of-way between Midpoint and Malin. Areas likely to contain archaeological and historical sites were examined on the ground by Cole's party. The proposed Malin to Medford route was ground surveyed under the direction of Ms. Julia A. Follansbee, an archaeological consultant from Eugene, Oregon.

A total of 73 archaeological sites were discovered by Cole's survey, and 7 sites were discovered by Ms. Follansbee's survey.

Midpoint to Malin

Midpoint to Hagerman Segment

No known historical or archaeological sites were found.

Hagerman to Owyhee Junction Segment

The proposed transmission line right-of-way would cross the Oregon Trail east of the Snake River near Hagerman. It would also cross approximately three miles south of Three Island Crossing State Historical Park; about two miles north of Robertson's Cave and approximately one mile south of a stage station site west of Bruneau Valley.

Fifteen archaeological sites, including village, campsites and manufacturing sites were located in the proximity of the proposed right-of-way.

Owyhee Junction to Catlow Junction Segment

The proposed right-of-way would cross about three miles northwest of the China Gulch Massacre Site on the Owyhee River; two miles north of the old Borax Works in the Alvord Desert; three miles south of a stage station site in the Alvord Desert and one mile north of a stage station site near Fields. It would also cross the old Oregon Central Military Road in two places in the Alvord Desert area.

Eleven archaeological sites were located, including possible village sites, campsites and manufacturing areas, in the vicinity of the proposed right-of-way.

Catlow Junction to Malin Segment

The proposed right-of-way would parallel the Oregon Central Military Road for about three miles in Fisher Canyon east of Crump Lake. It would also cross less than one mile south of the Stone Bridge Historic Site in Warner Valley between Crump and Hart Lakes.

Forty-seven archaeological sites were located, including several village sites, numerous camp and manufacturing sites, several petroglyph sites and a quarry site in the proximity of the proposed right-of-way.

Malin to Medford

A field survey along the proposed route was conducted by an archaeologist under contract to VTN Oregon, Inc., consultants to Pacific, during July, August and September, 1975. The purpose was to locate or identify archaeological, historical and paleontological resources within or near the proposed right-of-way. Research, prior to the field survey, included a search of pertinent literature, search of the files at the Museum of Natural History at the University of Oregon, and contact with the Oregon State Historic Preservation Office.

The archaeologist selected for field examination those areas judged most likely to contain evidence of past human use. Sites selected for study were areas adjacent to springs, adjacent to creeks and intermittent streams, major river banks, and areas surrounding the old shoreline of the now-drained Klamath Lake. To test the accuracy of the site selection method an eight consecutive mile section of the proposed route was completely examined - from the Malin substation westward. No sites were found along this eight mile section.

Five archaeological sites, west of the Klamath River in the eastern portion of the Siskiyou Mountain Range, were found along the proposed transmission line route. In addition, two other sites were identified from several hundred feet to about one-half mile from the proposed route. The sites, on the ground surface, contain numerous flakes, complete and fragmentary projectile points and cobbles.

No historic sites exist along the proposed right-of-way.

LAND USE

Midpoint to Malin

About two-thirds of Pacific's proposed right-of-way would traverse federal land. The Bureau of Land Management administers over 90 percent of the federal land involved.

TABLE II-31 breaks down by ownership the miles and percentage of the total land area that would be crossed by the proposed Midpoint to Malin right-of-way

TABLE II-31

LAND OWNERSHIP - MIDPOINT TO MALIN

Ownership	Miles	Percent
Federal		
Bureau of Land Management	252	64
U.S. Forest Service	17	5
Total Federal	269	69
State		
Idaho	5.5	1.5
Oregon	10.5	2.5
Total State	16	4
Private	106	27
Grand Total	391	100

The majority of the land is open range and undeveloped rural open space characterized by sparse settlement and small, widely separated communities. Uses are generally of the "extensive" type. "Open space" recreation and wildlife habitat are two common uses. These uses, however, are covered in the immediately preceding and succeeding sections of this report.

TABLE II-32 summarizes the number of miles of each land use that would be crossed by the proposed route and the number of acres of each use within the proposed 175-foot-wide right-of-way.

TABLE II-32

MILES OF EACH LAND USE - ACRES WITHIN MIDPOINT TO MALIN RIGHT-OF-WAY

Land Use	Miles	Acres Within Right-of-Way
Grazing	342.5	7,265
Agriculture	31.5	668
Forestry	15.5	329
Total	389.5 *	8,262

* The remaining 1.5 miles of this 391-mile-long route lie within the Warner Valley marshlands.

Grazing

Grazing of range livestock involves lands classified vegetatively as desert shrub, juniper, and grass. Some grazing use is also made in the coniferous forest type. Livestock grazing is by far the most common land use in the area that would be crossed by the proposed right-of-way, comprising some 342.5 miles, or over 87 percent of the route. A total of 7,265 acres within the proposed right-of-way are rangelands. (FIGURE II-21)

Primary livestock use is by cattle during the period from April to October, although there is a small amount of winter use. Most lands are under federal administration. Use is by local livestock operators under lease or license. Use is based on estimated forage carrying capacity, and varies widely on an acre per animal unit month (AUM) basis - from less than one acre per AUM (highly productive grass sites) to over 30 acres an AUM (nearly barren desert shrub types). There are an estimated 890 AUMs within the proposed right-of-way.

Forestry

The forestry land use classification includes all lands devoted to commercial timber production. These lands constitute a relatively small portion of the total route, but are economically significant to the localities involved. (Lakeview, Malin, Bly).

Timber lands along the route are found in the south-central Oregon area from east of Lakeview to a point roughly midway between Lakeview and Malin. The vast majority are within the Fremont National Forest. Forest lands total 15.5 miles, or 4 percent of the total route.

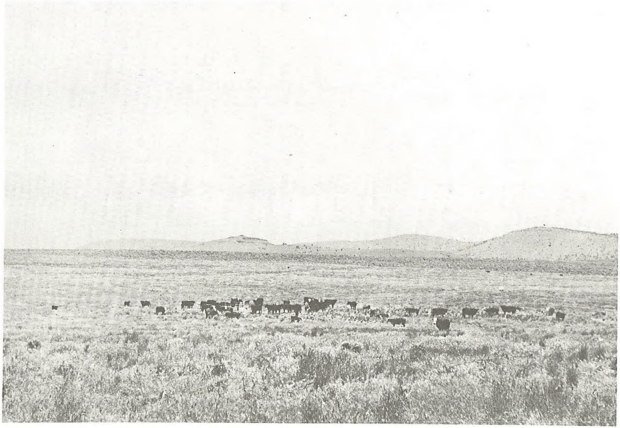


FIGURE II-21
Rangeland - Southeast Oregon

The proposed 175-foot-wide right-of-way includes 329 acres of forest land with an estimated present volume of 2,106,000 board feet (U.S.F.S. and B.L.M. estimates). The growth or production potential on this acreage is 93,000 board feet per year. Ponderosa Pine is the most common and highest value species. White fir is also important. Timber harvest is usually by selective logging methods.

Agriculture

The agricultural land use classification includes lands cultivated and used for production of alfalfa, irrigated pasture, grains and row crops. (FIGURE II-22) The proposed right-of-way would cross approximately 31.5 miles of agricultural lands, or about 8 percent of the total Midpoint to Malin route.

Climatic conditions along most of the proposed route limit agriculture endeavors primarily to alfalfa or hardy grains, but some row crops are grown in southern Idaho. Data is not available as to the exact acreage or yield of various types of agricultural products.

Specific areas of agricultural concentration include the area north of Hagerman, Deadman Flat, Browns Creek, Bruneau Valley, and Little Valley in Idaho and Goose Lake Valley in Oregon. Agricultural lands within the right-of-way total 668 acres.

Exact data are not available as to the breakdown between dryland farming and irrigated lands; or exact acreage of types of irrigation. However, irrigated lands predominate by far - probably over 90% of farm lands. Sprinkler irrigation is common in the southern Idaho area, while ditch or flood irrigation is more common on the agricultural lands crossed in Oregon.

Urban-Suburban-Commercial-Industrial

Pacific selected the proposed route to avoid areas of urban, suburban, commercial and industrial land uses. No urban or suburban areas would be directly traversed by the route. TABLE II-33 identifies communities within 3 miles of the proposed route.

TABLE II-33

COMMUNITIES WITHIN 3-MILES OF PROPOSED MIDPOINT TO MALIN RIGHT-OF-WAY

Community	Population	Proximity
Bruneau, Idaho	100	3 miles
Hagerman, Idaho	436	2 miles
Fields, Oregon (FIGURE II-23)	5	2 miles
Rome, Oregon	8	2 miles

FIGURE II-22
Agricultural Type
(Midpoint - Hagerman, Idaho)
Proposed Powerline Route ———

FIGURE II-23
Fields, Oregon
(aerial oblique - looking west)

Scattered residential land use occurs in rural agricultural area, and ranch residences are very scattered in range and forest areas.

According to Pacific's Environmental Assessment there are only 10 residences within 1,000 feet of the proposed route. (FIGURE II-24)

Special Land Uses

The special use classification includes lands devoted to highly specialized and/or unique uses susceptible to impact by the proposed project, such as wildlife refuges, military use areas, communication sites, and airports and airstrips. The proposed route would essentially avoid these types of special use areas, but they do occur in the general vicinity.

For approximately 18 miles the proposed route would pass just south of the Hart Mountain National Antelope Refuge in Lake County, Oregon. Proximity to the refuge would vary from immediately adjacent to about two miles distant.

The north boundary of Saylor Creek Air Force Range in Idaho lies 2 to 3 miles south of the proposed right-of-way in Owyhee County.

The Rome Radio Station (air navigation aid) is located about 3-1/2 miles southeast of where the proposed right-of-way would cross Malheur County, Oregon.

The Triangle airstrip in Idaho is 3 miles south, and the Rome, Oregon airstrip about 2 miles northwest of the proposed right-of-way.

Malin to Medford

This portion of Pacific's proposed 500 KV transmission line right-of-way would traverse private lands for almost three-fourths of the total length. All federal land that would be crossed is administered by the Bureau of Land Management.

TABLE II-34 breaks down by ownership the miles and percentage of total land area that would be crossed by the proposed Malin to Medford right-of-way.

TABLE II-34

LAND OWNERSHIP MALIN TO MEDFORD

Ownership	Miles	Percent
Federal (all BLM)	24	26
State	1	1
Private	67	73

FIGURE II-24
Ranch Near Idaho-Oregon Border
Proposed Powerline Route ———

As with the Midpoint to Malin portion, the proposed Malin to Medford right-of-way would avoid developed land as much as possible, and traverse mainly forest and open range country with small communities and sparse settlement. The categories and definition of land uses are those developed in the preceding discussion.

TABLE II-35 summarizes the number of miles of each land use that would be crossed by the proposed route and the number of acres of each use within the proposed 175-foot-wide right-of-way.

TABLE II-35

MILES OF EACH LAND USE - ACREAGE WITHIN MALIN TO MEDFORD RIGHT-OF-WAY

Land Use	Miles	Acreage Within Right-of-Way
Grazing	36	763
Agriculture	9	192
Forestry	47	997
Total	92	1,952

Grazing

Grazing by livestock is the most significant economic use of lands classified vegetatively as grasslands, desert shrub, juniper, and broad sclerophyll. Range-use lands comprise 36 miles, or about 39 percent of the total Malin to Medford route. Use is primarily by cattle. Use on Federal lands is under grazing leases issued by the Lakeview and Medford District Bureau of Land Management Offices.

Allowable use is based on forage production capacity and varies widely between areas, depending mainly on precipitation, growing season and past use. Productive grass sites may be rated as good as two acres per animal unit month (AUM) of forage. Capacity in other vegetative types would generally require 10 or more acres per AUM. There are a total of 763 acres of range lands within the proposed right-of-way, with an estimated 83 AUM's of forage.

Forestry

Production of forest products is the main economic land use in the vicinity of the proposed Malin to Medford right-of-way. Generally, the commercial forest zone extends from the vicinity of Hamaker Mountain westward to the vicinity of Breast Mountain. The proposed right-of-way would cross forest land for about 47 miles, or 51 percent of the total Malin to Medford route.

The proposed 175-foot-wide right-of-way would encompass approximately 997 acres of forest land containing 2,397 thousand merchantable board feet. The growth potential is 300,000 board feet per year (volume and growth estimates furnished by the B.L.M. Medford District Office).

Agriculture

The amount of agricultural land use directly in the vicinity of the proposed route is relatively small. There are a total of 192 acres of agricultural lands within the proposed right-of-way.

The greatest concentration of agricultural lands is in the Klamath Falls and Klamath Basin vicinity. The proposed route would traverse agricultural lands for 9 miles, or 10 percent of the total distance from Malin to Medford. Principal crops are alfalfa, grains and potatoes. Lands are irrigated most commonly by ditch or flood method.

Urban-Suburban-Commercial-Industrial

As a general rule, the proposed route would avoid urban, suburban, commercial and industrial land use. It would not directly cross any areas devoted to these uses. However, some of these uses, particularly residential, do occur in the vicinity of the proposed right-of-way.

TABLE II-36 identifies communities within 3 miles of the proposed right-of-way.

TABLE II-36

COMMUNITIES WITHIN 3-MILES OF PROPOSED MALIN TO MEDFORD RIGHT-OF-WAY

Community	Population	Proximity
Merrill	745	2 miles
Worden	50	1 mile

Scattered residences are found in rural agricultural areas and in some of the range and forest areas, particularly the area immediately east of Medford and Ashland.

Special Land Uses

Special land uses within 3 miles of the proposed right-of-way include Long Ranch Airstrip (2 miles); Buck Butte Communication Site (1 mile); Hamaker Mountain Radar Station (2 miles); Lower Klamath Wildlife Refuge (1 mile); Soda Mountain Communication Site (1 mile); Table Mountain Lookout Tower (2 miles); and Roxy Ann Peak Communication Site (2 miles).

LAND USE PLANNING AND CONTROLS

Midpoint to Malin

A wide variety of planning activities are underway in southwestern Idaho and southeastern Oregon. Planning is being conducted by federal, state, regional, county and local government, and by private groups. Planning activities vary in scope from a multistate approach used by the Pacific Northwest River Basins Commission to corporate planning for specific sites on a few acres of land. At the present time, it appears few of these planning efforts have led to zoning ordinances, controls, or constraints that are in effect for lands crossed by the proposed 500 KV powerline.

Land use controls which are now in effect, or will become effective in the near future concerning the lands crossed by the proposed powerline include zoning ordinances, Federal withdrawals, and Federal land use plans.

Zoning ordinances presently in effect usually are confined to land uses and subdivision regulations for cities or the areas surrounding cities, towns, or communities. For instance the Twin Falls County zoning ordinance in its General Provision Article 7-23 states:

> Public Utilities
> "Nothing contained in this zoning ordinance shall be deemed to specify or regulate the type or location of any pole, towers, wires, above ground cable or conduits, or any other similar above ground distributing equipment of a public utility, except as would affect airport operations."

It appears that no zoning ordinances are in effect which would regulate, restrict, or prohibit a power transmission line on lands crossed by the proposed route.

A withdrawal of Federal lands has been made for the Saylor Creek Aerial Gunnery Range. Although the proposed route does not directly involve any of the withdrawn lands, its proximity to these lands merits comment. An original route proposed for the powerline would parallel the northern boundary of the withdrawn lands about ¼ mile to the north. U. S. Air Force representatives met with Pacific to suggest re-routing this portion of the powerline. Although the proposed powerline would not directly impinge on withdrawn lands, use of the lands includes very low level flights day or night at speeds of over 300 knots. To reduce the risk of an aircraft collision with the proposed powerline, Pacific re-routed this segment to pass farther north and at a lower elevation above mean sea level. High voltage powerlines are not consistent with the purposes for which this withdrawal was made, and an application to cross the lands with a powerline would probably not be approved.

The Bureau of Land Management has developed some land use plans (called Management Framework Plans) on portions of the Federal lands crossed by the proposed powerline. Completed MFP's include the Twin Falls, Saylor Creek

and West Owyhee units in Idaho and North Malheur, Central Malheur and Andrews Units in Oregon. These land use plans contain decisions relating to specific uses and combinations of uses for the Federal lands.

The Twin Falls MFP includes a decision to route powerlines adjacent to existing powerlines wherever possible. The North and Central Malheur MFP's have identified right-of-way corridors. The West Owyhee MFP similarly has identified right-of-way corridors which basically include lands presently crossed by utility lines. The corridors identified for future rights-of-way are consistent from Idaho to Oregon.

During development of the West Owyhee MFP, the proposed route was studied for feasibility from a resource management standpoint. Conflicts with wildlife winter range, proposed back country area, and state parks were identified, analyzed and discussed during public meetings. The completed MFP contains a decision to establish a right-of-way corridor along existing utility lines roughly from Hagerman to Mountain Home to the Boise area, then west. The proposed route is not consistent with this identified corridor. Two of the alternate routes described in Chapter VIII are very similar to the corridor identified in the West Owyhee MFP.

Although not supported by zoning or other measures for enforcement, Harney County has formulated a general utility policy which includes the following provisions:

1. To plan for the most efficient locations of these facilities in relationship to health, economy and liveability for all citizens.

2. To recommend the development of such facilities on non-agricultural lands towards those with less productive soils.

3. To encourage continuing growth of public utilities to provide adequate and desirable services necessary to maintain the environment in an attractive and functional manner.

Malin to Medford

As described in the Midpoint-Malin section, a variety of planning has been completed or is underway, but few controls or constraints are presently in effect which apply to the proposed powerline route. Land use plans (management framework plans) were completed for the Klamath and Jackson planning units by BLM in 1971. These contained decisions that future powerlines should follow existing powerlines wherever possible. The portion of the proposed route that parallels the existing 230 KV powerline is consistent with the management framework plan decisions. The proposed powerline does not appear to conflict with current zoning ordinances.

TRANSPORTATION NETWORK

Midpoint to Malin

The majority of the region potentially affected by Pacific's proposed 500 KV powerline right-of-way has a limited transportation network. Highway access to much of the southern portion of the region is extremely limited. Interstate Highway 80 North is the major highway route across southern Idaho. Except for about 30 miles, it is complete from the state line southeast of Burley, Idaho through Twin Falls, Boise, and Ontario, Oregon. I-80 continues from Ontario to Baker, La Grande, Pendleton, The Dalles and Portland.

U.S. Highway 26, 20 and 30 are east-west routes generally paralleling or concurrent with I-80 across southwestern Idaho.

North-south routes are limited to U.S. Highway 93 which runs through Jackpot, Nevada to Twin Falls, north to within a mile of the Midpoint substation and continues to Shoshone, Idaho and points North.

State Highway 51 extends from Mountain Home, Idaho south to the Nevada state line. Secondary Highways 45, 67, 72 and others provide limited access along the Snake River, but most of Owyhee County is not served by hard surfaced highways.

In Oregon, U.S. Highway 20 from Ontario and Vale is a major east-west route through Burns, Bend and on to the Pacific Coast at Newport. U. S. Highway 95 between Homedale and Marsing, Idaho extends south through Jordan Valley, Oregon, Burns Junction, and south to McDermitt and Winnemucca, Nevada.

Oregon State Highway 78 connects Burns Junction with Burns. U.S. Highway 395 from New Pine Creek and Lakeview, Oregon, extends north through Burns and John Day. State Secondary 31 connects U.S. 395 north of Lakeview with U.S. Highway 97 at La Pine.

U.S. Highway 97 from California is a major north-south route through Klamath Falls, Bend, Madras and north. Unimproved roads provide limited access to the region. There are relatively large land areas accessible only by gravel or "jeep" roads. It should be noted however, that these "jeep" roads are relatively numerous and few areas are completely inaccessible.

The Union Pacific Railroad from Kemmerer, Wyoming and Ogden, Utah passes through Pocatello and west through Jerome, Mountain Home and Boise, Idaho on to Oregon and Ontario, continues northwest to Pendleton. A Union Pacific spur line extends from the Idaho-Oregon state line through Vale, Oregon to Burns.

The Oregon and Northwestern spur extends north from Burns. A Southern Pacific spur from California serves Lakeview. The Southern Pacific and Burlington Northern primary railroad extends from Klamath Falls north. The California and Eastern spur line serves Sprague River and extends to Modoc and Sycan Valley. Southeastern Oregon and the extreme southwestern corner of Idaho are distant from rail facilities.

United Air Lines provides scheduled service from Boise, Idaho, and serves Pendleton and Medford, Oregon. Hughes Airwest serves Boise, Twin Falls, Pocatello and Idaho Falls, Idaho, and in Oregon provides scheduled flights from Klamath Falls and Medford. Air charter service is available in most of the major communities.

Malin to Medford

Interstate 5 and U. S. Highway 99 are the major highways which pass through the central valley portion of Jackson County. Oregon State Highways 62, 66, and 140 cross the county from the east to west. Oregon State Highway 227 connects the county to the north. Interstate Highway 5 provides transportation to major points north and south. Regular bus and freight-truck schedules are maintained over most major routes.

A Southern Pacific Railroad branch-line, formerly the main line, passes through the central valley providing service both north and south. Medford has a municipal airport and is served by commercial airlines with connections both to the north and south.

U. S. Highway 97 runs through Klamath Falls as it crosses the county going from the California border to Deschutes County on the north. State Highways 66 and 140 run east-west across the southern portion of the county. State Highways 62 and 58 also connect the county with the western portion of the state.

Klamath Falls has a municipal airport served by Hughes Airwest and charter flights. Four commercial bus lines provide scheduled service from Klamath Falls. Railway, including passenger service is available in the county.

Railroad companies operating in the county include: Amtrak; Burlington Northern; Oregon, California and Eastern Railway; and Southern Pacific.

ESTHETICS

Midpoint to Malin

The esthetic setting of southwestern Idaho and southeastern Oregon that would be crossed by the proposed right-of-way is characterized by extensive open space and numerous unique geological and botanical landscape features.

Outstanding features include a number of picturesque lakes which are remnants of much larger water bodies that existed during glacial times. Many are associated with spectacular fault-block mountains. The most prominent examples are Lake Abert and Abert Rim, Summer Lake and Winter Ridge, Warner Lakes, Hart Mountain, Malheur Lake, and Steens Mountain which is the world's largest fault-block mountain.

Other prominent landscape features include the Snake, Bruneau and Owyhee River Canyons, Jordon Craters lava flows, Bruneau Sand Dunes and Christmas Lake Valley Sand Dunes.

Vegetative types range from the Steens Mountain arctic-alpine type to the stark Alvord Desert. The Lost Forest, an isolated relic portion of the great prehistoric ponderosa pine forests of eastern Oregon, is representative of the area's varied vegetative type.

The esthetic and recreation maps A-3 and B-3 in the Appendix of the Draft Statement identify numerous designated areas including wildlife refuges, natural areas, state parks, scenic waterways, wild and scenic study rivers and other areas whose natural values have been formally recognized. Because of its rich, varied and relatively undeveloped landscape, much of the area that would be crossed by Pacific's proposed right-of-way is considered by many to be a unique esthetic environment worthy of overall consideration and analysis.

The difficulty of assigning values to the esthetic environment has long been recognized. It is true that "beauty is in the eye of the beholder," however, research in visual perception has verified factors that can be used as a relative measure of visual quality.

The key element is - variety, in land form, in vegetative patterns, and in color. The presence of water also increases scenic values. Inharmonious intrusions detract from scenic value. Uniqueness can play a major role in scenic interest. If an area is the only one of its kind, it has a higher relative value.

The general esthetic values of the area that would be crossed by Pacific's proposed route have been quantified with the Bureau of Land Management's Recreation Information System (RIS) procedures. (See Appendix B)

These procedures define rating areas, or landscapes with similar characteristics (i.e., land form, vegetation, etc.) and similar visual patterns (i.e., texture, color, variety, etc.).

A numerical rating system for key factors (land form, color, water, vegetation, uniqueness and intrusions) is then utilized to rate scenic quality on a relative scale:

Class	
A	High scenic quality
B	Moderate scenic quality
C	Low scenic quality

Scenery evaluations and numerical rating scores for the proposed right-of-way and adjacent areas are shown on Maps A and B in the Appendix of the Draft Statement.

The esthetic sensitivity of the area along the proposed right-of-way route has been quantified using the Forest Service's Visual Management System criteria. (See Appendix C)

Esthetic sensitivity is a measure of the extent and sensitivity of visual use of an area. This is determined by (1) the number of people who view a particular landscape with a major interest in visual qualities and (2) the amount of time spent viewing the landscape or esthetic value. Three classes of sensitivity are used:

Class	
1	Highest sensitivity
2	Moderate sensitivity
3	Lowest sensitivity

Esthetic sensitivity factors for the area that would be crossed by Pacific's proposed right-of-way are shown on Maps A-4 and B-4 in the Appendix of the Draft Statement.

TABLE II-37 summarizes the scenery values and sensitivity classification of the area that would be crossed by Pacific's proposed 391-mile-long Midpoint to Malin 500 KV transmission line right-of-way.

TABLE II-38 provides annual daily traffic data, scenery values and sensitivity classification for areas where the proposed right-of-way would cross major highways.

TABLE II-39 identifies, by county, the number of secondary roads (county, Forest Service, Bureau of Land Management and other maintained roads) that would be crossed by the proposed right-of-way.

The following discussion describes by route segment the esthetic value and major sensitivity classification factors of the area traversed by the proposed right-of-way. Photographs are utilized extensively to portray esthetic character and values.

TABLE II-37

SCENERY VALUES & SENSITIVITY CLASSIFICATION - MIDPOINT TO MALIN

Miles of Right-of-Way	Scenery Value/Sensitivity
9.5	A1
2.0	A2
69.0	B2
6.0	B3
5.0	C1
218.5	C2
81.0	C3

TABLE II-38

MAJOR HIGHWAY AND ROAD CROSSINGS - MIDPOINT TO MALIN

Crossing	Daily Traffic	Scenery Value/Sensitivity
U.S. Highway 93	1,900	C2
State Highway 46	1,800	C2
State Highway 25 (Interstate 80 N)	3,000	C2
U.S. Highway 30	1,100	C2
State Highway 51	180	C2
U.S. Highway 95	190	C2
State Highway 140	360	B2
U.S. Highway 395	940	C2
State Highway 140	520	C2

TABLE II-39

SECONDARY ROAD CROSSINGS - MIDPOINT TO MALIN

County	Number of Crossings
Gooding County	4
Owyhee County	9
Harney County	2
Lake County	11
Klamath County	3

Midpoint to Hagerman Segment

From the Midpoint Substation the proposed route would follow an existing 230 KV Idaho Power Company transmission line across exposed lava beds thinly covered in places with soil and cheatgrass. With the exception of the existing transmission line and 2 major transportation routes, this portion of the proposed right-of-way area is free of major man-made landscape intrusions. (FIGURE II-25)

On the east side of the Snake River the route would cross approximately 4 miles of irrigated agriculture and pasture lands with scattered ranches and homes. From the Midpoint Substation to the Snake River it would cross 4 major transportation routes with 7,800 annual daily traffic (ADT).

U.S. Highway 93	-	1,900 ADT
Idaho Highway 46	-	1,800 ADT
Idaho Highway 25 (Now Interstate 80 N)	-	3,000 ADT
U.S. Highway 30	-	1,100 ADT

The proposed right-of-way would cross the Snake River at Lower Salmon Falls Dam approximately 1.75 miles northwest of the community of Hagerman. The crossing is preceded by existing electrical transmission lines and scattered residences. (FIGURE II-26)

The terrain at the river crossing is characterized by a steep 600-foot drop from the western canyon rim to the river with a lesser, more gently sloping eastern escarpment. Vegetation ranges from riparian species adjacent to the river to a high desert shrub type on the adjacent canyon slopes. (FIGURE II-27)

The proposed right-of-way would cross within 1.25 miles of the south boundary of the recently established Malad Gorge State Natural Park located in a highly scenic tributary of the Snake River.

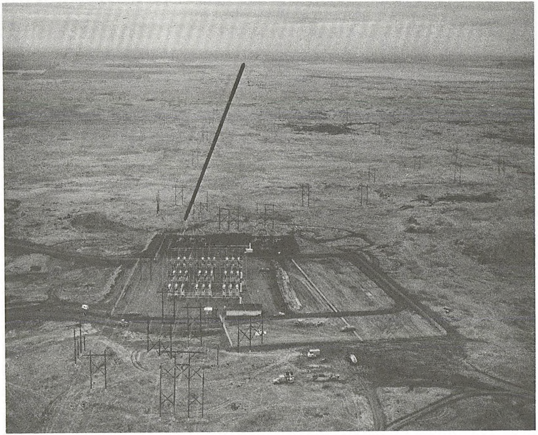


FIGURE II-25
Midpoint Substation
(looking west)
Proposed Powerline Route ———

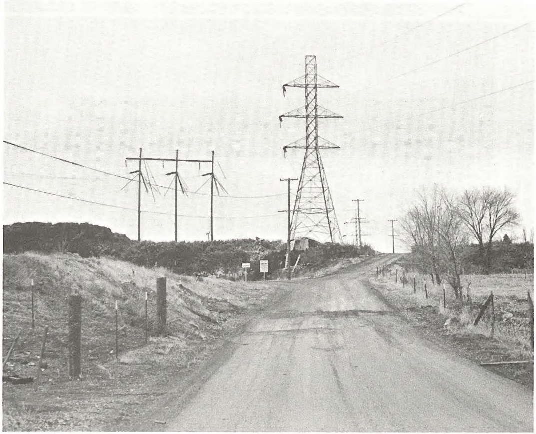


FIGURE II-26
Existing Transmission Line Between
Midpoint and Hagerman
Just East of Snake River Near Lower Salmon Falls Dam

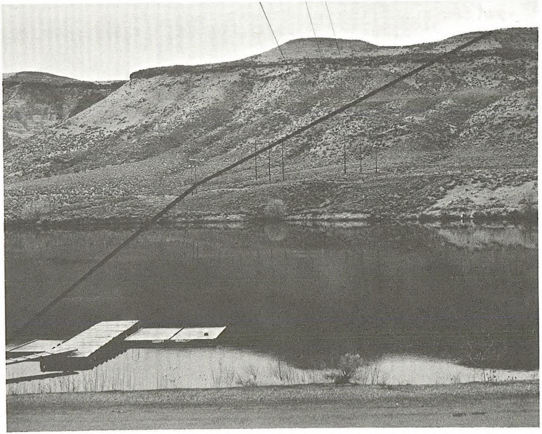


FIGURE II-27
Existing Transmission Line Crossing
Snake River Above Lower Salmon Falls Dam
Proposed Powerline Route ———

It would pass approximately 1.5 miles northeast of the proposed Hagerman Fossil Beds National Monument. The Hagerman fauna sites are recognized as one of the world's most important pliocene areas (National Park Service, 1974).

Senate Bill S. 224, introduced January 17, 1975 would establish the Hagerman Fossil Beds National Monument.

The proposed right-of-way would be situated adjacent to a small Lower Salmon Falls Dam picnic and boat launching recreation area.

The Midpoint to Hagerman Segment, including the Snake River crossing, is paralleled by existing transmission lines. Scenery - sensitivity ratings for this segment are:

B2 - 1 mile (Snake River crossing)
C2 - 24 miles
C3 - 1 mile

Hagerman to Owyhee Junction Segment

Extending westerly from the Snake River, the proposed right-of-way would cross the Snake River Plain, an area of generally level terrain with desert shrub - grassland vegetation. Scattered farms and cattle ranches occupy lowland areas where streams have carved their way through the level landscape. Riparian vegetation and intermittent irrigation operations create an irregular pattern of green against the arid landscape of brown and chalk-colored soil.

Paralleling the Snake River, it would pass approximately 3 miles south of the Three Island Crossing State Historical Park and within 3/4 of a mile of the southeast corner of the Bruneau Sand Dunes State Natural Park. Public use of these areas in 1973 was 112,723 and 63,298 visits respectively.

The proposed right-of-way would cross Bruneau Valley, a picturesque area of irrigated agriculture and pasture lands with scattered farms.

The community of Bruneau is located approximately 3 miles north of the proposed right-of-way which would cross within 4 miles of C. J. Strike Reservoir in the northern extremity of Bruneau Valley.

Reservoir recreation developments include the Bureau of Land Management's Cove Recreation Site, an Idaho Fish and Game boatramp and campground and the privately operated Black Sands Resort, estimated 50,000 visitor days (primarily fishing) were recorded in 1974.

Continuing westerly from the Snake River Plain, the proposed right-of-way would extend through the Owyhee Mountains pass separating the scenic Silver City Range on the north and South Mountain on the south. This pass is characterized by level to hilly terrain interspaced with deeply incised scenic canyons such as Boulder Creek. (FIGURE II-28)

Vegetation consists of scattered juniper on the upland areas and scattered riparian vegetation in the valleys and canyon bottoms. Aside from scattered ranch structures and roads, this portion of the proposed

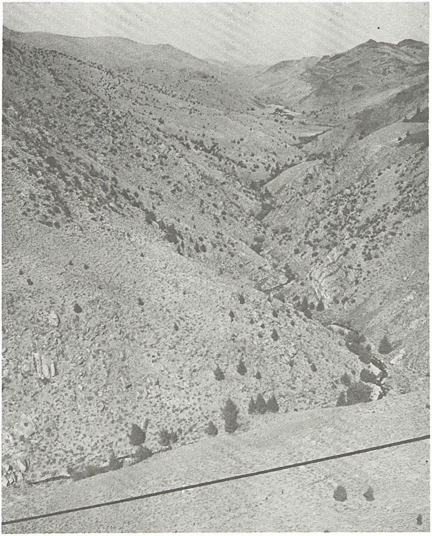


Figure II-28
Boulder Creek - Between Silver City Range
and South Mountain, Owyhee Mountains
Proposed Powerline Route ———

right-of-way area is free of major man-made landscape intrusions. The Owyhee Mountain receives heavy deer and upland game hunting during the fall months. The proposed right-of-way would not be visible from the Silver City Historic Site, situated 12 miles to the north.

Passing west through the Owyhee Mountains, the proposed right-of-way would cross scenic Jordon Creek canyon (FIGURE II-29) and generally level to undulating and broken terrain with high desert shrub scattered juniper vegetation.

After crossing the Idaho-Oregon border, the proposed right-of-way would pass about south and roughly parallel to U.S. Highway 95, across level to broken terrain and high desert shrub vegetation. The proposed right-of-way crosses 1.5 miles south of Antelope Reservoir, a shallow 3,000 acre irrigation impoundment receiving moderate fishing activity. A Bureau of Land Management recreation site at Antelope Reservoir received an estimated 5,000 visitor days of use in 1974.

That portion of the proposed right-of-way segment west of the Oregon-Idaho border, with the exception of U.S. Highway 95 and Antelope Reservoir, is generally free of major man-made landscape intrusions.

The Hagerman to Owyhee Junction Segment would cross several county-maintained secondary roads and State Highway 51, which had 1972 annual daily traffic of 180 vehicles at the proposed right-of-way crossing.

Scenery-sensitivity ratings for this segment are:

A2	-	2 miles (Owyhee Mountains - Boulder Creek crossing)
B2	-	30 miles (Owyhee Mountains)
C1	-	5 miles (Area adjacent to Bruneau Sand Dunes)
C2	-	57 miles
C3	-	42 miles

Owyhee Junction to Catlow Junction Segment

From Owyhee Junction west, the proposed right-of-way would continue across generally level terrain with high desert shrub vegetation to the Owyhee River 2 miles south of U.S. Highway 95 and the community of Rome.

The proposed right-of-way would cross the Owyhee River which is included under Section 5 (a) of the Wild and Scenic Rivers Act. The right-of-way would cross at the "low quality scenic gap" separating the highly scenic portions north and south of Rome.

The proposed river crossing is characterized by a low terrace-type terrain on the southwest bank with a moderately steep canyon wall rising 700 - 800 feet above the river on the northeast. (FIGURES II-30 and 31) Vegetation at the proposed crossing is high desert shrub type. The immediate vicinity of the river crossing is free of major man-made landscape intrusions.

FIGURE II-29
Jordon Creek Canyon
Proposed Powerline Route ———

FIGURE II-30
Owyhee River Above Rome, Oregon
(looking downstream)
Proposed Powerline Route ———

FIGURE II-31
Owyhee River Above Rome, Oregon
(looking upstream)
Proposed Powerline Route ———

The Owyhee River at the proposed crossing was utilized by 13 white water float trips (80 people) during 1974.

Southwesterly from the Owyhee River the proposed right-of-way would continue across generally level to broken terrain with high desert shrub vegetation.

Dry lake beds and sand dune formations associated with the Alvord Desert region are common throughout the area that would be crossed by the proposed right-of-way. Irrigated lands of the White Horse Ranch, situated 6 miles to the south, provide the only year round green area along this segment of the proposed Midpoint to Malin right-of-way.

The proposed right-of-way would extend across the area viewed from the Steens Mountain scenic overlook (9,500 foot elevation) located a minimum of 21 miles to the northwest. (FIGURE II-32)

The Steens Mountain scenic overlooks provide extensive views of the generally undeveloped Alvord Desert. They are a focal point for visitors to the Steens Mountain Recreation lands which received an estimated 400,000 visitor days of use in 1974.

Under favorable atmospheric conditions the irrigated fields of White Horse Ranch can be observed from the Steens Mountain scenic overlooks 26 miles distant.

On the east side of Pueblo Valley, the proposed right-of-way could meet and parallel an existing 115 KV power line across the valley, passing approximately 1 mile north of the small settlement of Fields and through Long Hollow to Catlow Junction. (FIGURE II-33)

Long Hollow separates Steens Mountain to the north from the Pueblo Mountains to the south. It has high desert shrub vegetation. The proposed right-of-way would bisect the proposed route of the High Desert Trail which extends north-south from the Pueblo Mountains to the Steens Mountain across Long Hollow.

The Owyhee Junction to Catlow Junction Segment of the proposed right-of-way would cross 1 major highway and several county-maintained secondary roads, including the Harney County road extending from Oregon State Highway 78 to Denio, Nevada via the east side of Steens Mountain. Annual daily traffic at the U.S. Highway 95 crossing in 1973 was 690 vehicles.

With the exception of major and secondary transportation routes, the settlement of Fields and White Horse Ranch, the proposed route segment is free of major man-made landscape intrusions.

Scenery-sensitivity ratings for this segment are:

C2 - 84.5 miles

FIGURE II-32
Desert Area Southeast of Steens Mountain
Proposed Powerline Route ———

FIGURE II-33
Long Hollow
Proposed Powerline Route ———
(follows existing 115 Kv powerline)

Catlow Junction to Malin Segment

From Catlow Junction west, the proposed route would cross generally level to undulating and broken terrain with high desert shrub vegetation. It would cross the southern flank of Beatty's Butte, a rolling mountainous terrain feature of local significance. This area's primary esthetic value is its undeveloped, open-space nature.

The proposed right-of-way would enter Warner Valley from the southeast via Fisher Canyon (FIGURE II-34) which was once the route of the Oregon Central Military Road (1867).

It would cross the valley at the narrows separating Hart and Crump Lakes (FIGURE II-35) approximately 1/2 mile south of the historic Stone Bridge (FIGURE II-36) which is presently listed on the National Register of Historic Places.

The Warner Valley area represents a unique high desert combination of topographical features and water areas of high scenic value. The Warner Lakes, including Hart and Crump Lakes, provide a scenic foreground against the steep to vertical escarpments of the Fish Creek Rim and Hart Mountain, rising approximately 2,500 feet above the valley floor. Riparian vegetation associated with the Warner Lakes provide a sharp contrast to the adjacent basaltic slopes and high desert shrub vegetative type. The graded Lake County road on the west side of Warner Valley, which the proposed right-of-way crosses, provides excellent scenic views of Hart and Crump Lakes, Hart Mountain and the Fish Creek Rim. The visual setting of Warner Valley, with exception of some widely scattered ranch structures, is generally free of major man-made landscape features. (FIGURE II-37)

The route would be situated immediately adjacent to the south boundary of Hart Mountain National Wildlife Refuge which received a total of 23,326 recreation visits in 1973. Crump Lake on the south of Hart Mountain Natural Wildlife Refuge, receives heavy waterfowl hunting during the fall months.

Extending southwesterly from Warner Valley, the proposed right-of-way would traverse gently sloping to rolling terrain with desert shrub and scattered juniper vegetation. The stair-step rimrock and lowland pattern of the Basin-Range Province becomes less pronounced as it gives way to the timbered slopes and hills of the Fremont National Forest.

The proposed right-of-way would cross Lake County Road 313, extending from State Highway 140 to the community of Plush, (FIGURE II-38) and bisect the Bonneville Power Administration 750 DC transmission line west of Warner Valley.

Extending westerly from the eastern boundary of Fremont National Forest, the proposed right-of-way would parallel and then cross State Highway 140 on the open Camas Prairie. (FIGURES II-39 and II-40) Annual daily traffic at the proposed highway crossing was 360 vehicles in 1973.

Continuing westerly, the proposed right-of-way would cross the scenic Warner Mountains, characterized by rolling to steep and broken terrain and vegetation ranging from junipers to conifers. The Warner Mountains receive moderate to heavy deer hunting activity during the fall months.

FIGURE II-34
Fisher Canyon
Proposed Powerline Route ———

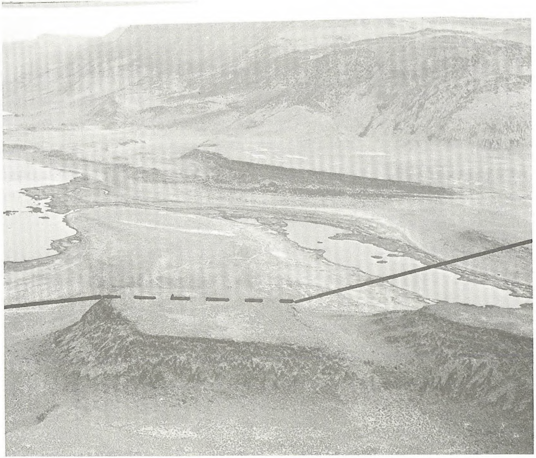


FIGURE II-35
Narrows Separating Crump and Hart Lakes
Stone Bridge Near Center of Narrows
Proposed Powerline Route ———

FIGURE II-36
Stone Bridge Across Narrows Between
Hart and Crump Lakes

FIGURE II-37
Crump Lake - Hart Mountain in Background
Proposed Powerline Route ———

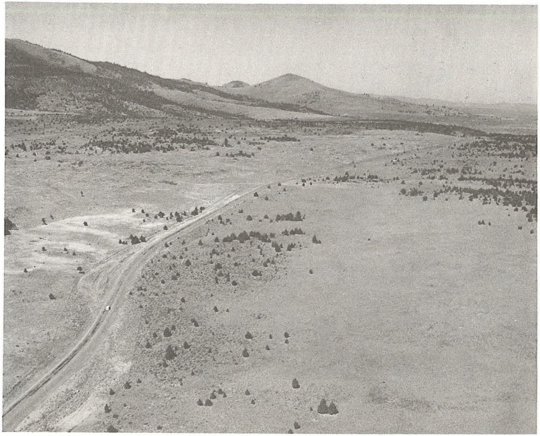


FIGURE II-38
Lake County Road 313
(looking north - proposed route just to the south)

FIGURE II-39
Fremont National Forest - West End Camas Prairie

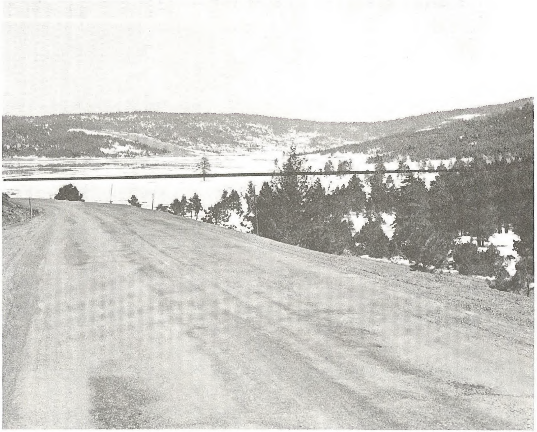


FIGURE II-40
State Highway 140 - Camas Prairie
Proposed Powerline Route

The proposed right-of-way would parallel State Highway 140 for approximately 1 mile through this area, passing less than 1 mile from the Warner Ski Area, (FIGURE II-41) a non-profit operation on Forest Service land under a special use permit. Use was estimated at 5,500 visitor days in 1974.

That portion of the proposed right-of-way from Warner Valley to Goose Lake Valley, with the exception of major and secondary transportation routes, the BPA 750 DC transmission line and the Warner Ski Area, is generally free of major man-made landscape intrusions.

After leaving the Fremont National Forest, the proposed right-of-way would cross the northern end of Goose Lake Valley, turn south and run along the western edge of the valley. (FIGURE II-42) The terrain ranges from gently sloping in the valley to rolling foothills along the western edge of the valley.

The Goose Lake Valley area, with the community of Lakeview, situated approximately 10 miles east and 4 miles south of the proposed route, is characterized by scattered agriculture, ranches and homes.

Through Goose Lake Valley the proposed right-of-way would cross 2 major highways and several secondary roads including several county-maintained and Fremont National Forest access roads. Annual daily traffic at the proposed major transportation route crossings in 1973 was:

Oregon State Highway 140 - 520 ADT
U. S. Highway 395 - 940 ADT

Proceeding westerly from Goose Lake Valley, the proposed right-of-way would parallel the Oregon-California line across flat to rolling mountainous terrain with vegetative types ranging from juniper to ponderosa pine and white fir. The area from Goose Lake Valley to the Malin Substation receives heavy deer hunting pressure during the fall months. Moderate waterfowl hunting activity occurs on water and marsh areas along the proposed right-of-way.

It would cross the southern portion of Langell Valley immediately adjacent to the southern extremity of Willow Valley Reservoir. This irrigation impoundment receives moderate fishing pressure during spring and fall months. (FIGURE II-43)

From Willow Valley Reservoir, the proposed right-of-way would continue west along the Oregon-California border, across Lost River and on to the Malin Substation. (FIGURE II-44)

In summary, this segment of the proposed right-of-way would cross and parallel several county, Forest Service and private secondary transportation routes, including Lake County Roads 313 (State Highway 140 to Plush) and 310 (Adel to Plush), several Goose Lake Valley roads and several county and Fremont National Forest roads between Goose Lake Valley and Malin.

The portion of the proposed right-of-way from Warner Valley to Goose Lake Valley, with the exception of major and secondary transportation routes, the BPA 750 DC transmission line and the Warner Ski area, is basically free of major man-made landscape intrusions. That portion of the proposed right-of-way from Goose Lake Valley to the Malin substation, with the exception of

secondary transportation routes and Willow Valley Reservoir, is also basically free of major man-made landscape intrusions.

Scenery-sensitivity ratings for this segment are:

A1	-	9.5 miles (Warner Valley, Warner Mountains)
B2	-	38 miles
B3	-	6 miles
C2	-	53 miles
C3	-	38 miles

Malin to Medford

The esthetic setting of the area that would be traversed by Pacific's proposed right-of-way includes the Klamath Basin and the Southern Oregon Cascades. Outstanding scenic features include the highly scenic Cascade and Siskiyou Mountains and Klamath River canyon.

The esthetic and recreation Map B-3, appendix of the Draft Statement, identifies scenic classifications and esthetic sensitivity factors and developed recreation facilities, wilderness areas, the Pacific Crest Trail and other designated use areas. Methodology is described in the introduction to the preceding Midpoint to Malin discussion.

TABLE II-40 summarizes the scenery values and sensitivity classification of the area that would be crossed by Pacific's proposed 92-mile-long Malin to Medford 500 KV transmission line right-of-way.

TABLE II-41 provides daily traffic data and scenery values and sensitivity classification for areas where the proposed route would cross major highways and roads.

TABLE II-42 identifies by county the number of times secondary roads (county, Forest Service, Bureau of Land Management and other maintained roads) would be crossed by the proposed right-of-way.

TABLE II-40

SCENERY VALUES & SENSITIVITY CLASSIFICATION - MALIN TO MEDFORD

Miles of Right-of-Way		Scenery Value/Sensitivity
1.0	(Klamath River)	A1
47.5		B2
19.0		B3
24.5		C2

FIGURE II-41
Warner Ski Area
Proposed Route About One Mile South

FIGURE II-42
Angle Point Southwest of Lakeview
Proposed Powerline Route ———

FIGURE II-43
Willow Valley Reservoir
(proposed route crosses at botton of photo)

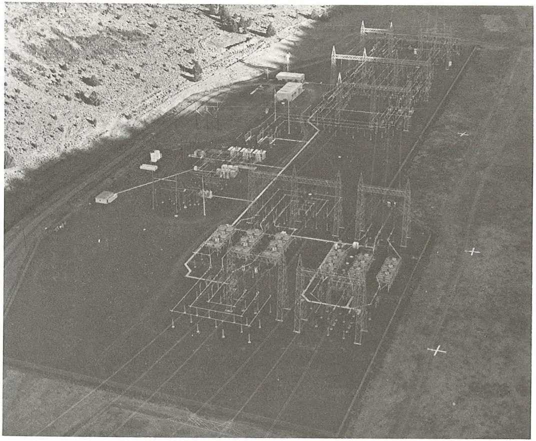


FIGURE II-44
Malin Substation

TABLE II-41

MAJOR HIGHWAY AND ROAD CROSSINGS - MALIN TO MEDFORD

Crossing	Annual Daily Traffic	Scenery Value/Sensitivity
State Highway 39	3,450	C2
U. S. Highway 97	2,250	C2
State Highway 66	770	B2

TABLE II-42

SECONDARY ROAD CROSSINGS - MALIN TO MEDFORD

County	Number of Crossings
Klamath	8
Jackson	3

Malin to Stukel Segment

From the Malin Substation, the proposed right-of-way would cross rolling to gently sloping foothill terrain on the fringe of the scattered juniper-grassland and agriculture area of the Klamath Basin. (FIGURE II-45) It would pass 4 miles northeast of the community of Malin, and less than 3 miles north of the community of Merrill. Numerous ranch and farm residences are scattered throughout the Malin-Merrill area.

The proposed right-of-way would cross 4 secondary transportation routes.

Scenery sensitivity ratings for this segment are:

B2 - 7.5 miles
C2 - 10.5 miles

Stukel to Green Springs Segment

Extending westerly, the proposed right-of-way would extend across the Klamath Basin approximately 10 miles south of Klamath Falls. It would cross the Klamath Hills, a low foothill area situated within the otherwise level

FIGURE II-45
Malin Substation
Proposed Powerline Route ———

Klamath Basin. Through the Klamath Basin, it would cross marsh-farmland in the basin proper with a scattered juniper-grassland vegetative type on the Klamath Hills. (FIGURE II-46)

It would pass less than 1 mile north of the community of Worden (FIGURE II-47) and 1 mile north of the Lower Klamath National Wildlife Refuge, a registered National Historic Landmark. The Klamath Basin receives heavy migratory waterfowl hunting and observation activity.

Extending westerly from the Klamath Basin, the proposed route would cross moderately scenic (Class B) rolling mountainous terrain with mixed conifer vegetation before crossing the highly scenic (Class A) Klamath River, a deeply incised 1000 plus foot-deep river canyon characterized by steep sloping canyon walls and a mixed conifer vegetative type. (FIGURE II-48)

The Klamath River, above Copco Lake, receives more than 30,000 visitor days of trout fishing annually. The Klamath River canyon, in the vicinity of the proposed right-of-way crossing already has existing landscape intrusions, including a 69 KV transmission line and an irrigation water flume.

Extending westerly from the Klamath River, the proposed right-of-way would parallel an existing 230 KV transmission line across moderately scenic (Class B) rolling to moderately steep mountainous terrain with mixed conifer vegetation. (FIGURE II-49)

It would cross the planned location of the Pacific Crest Trail near the summit of Soda Mountain.

The area from the Klamath Basin to Green Springs receives heavy deer hunting pressure. The proposed right-of-way area from the Klamath Basin to Green Springs, with the exception of the 69 KV transmission line and irrigation flume in the Klamath River canyon and the parallel 230 KV transmission line west of the Klamath River, is generally free of major man-made intrusions.

This segment crosses 2 major highways and 3 secondary roads. Annual daily traffic at the major highway crossings in 1973 was:

State Highway 39	3,450 ADT
U. S. Highway 94	2,250 ADT

Scenery - sensitivity ratings for this segment are:

A1 -	1 mile	(Klamath River)
B2 -	17 miles	
B3 -	19 miles	
C2 -	14 miles	

Green Springs to Lookout Segment

Extending northerly from Green Springs, the proposed route would cross moderately scenic (Class B) steep, sloping, broken terrain with oak-grassland and conifer vegetation. It would cross less than 4 miles west of Hyatt Reservoir, an extensively developed recreation area receiving heavy water-oriented recreation use. This portion of the segment receives heavy deer hunting pressure.

FIGURE II-46
Farmland - Klamath Basin
(proposed powerline route crosses Klamath
hills on slope visible on right side of photo)

FIGURE II-47
California-Oregon State Line
(looking north towards Worden - proposed
route would follow near edge of hills in background)

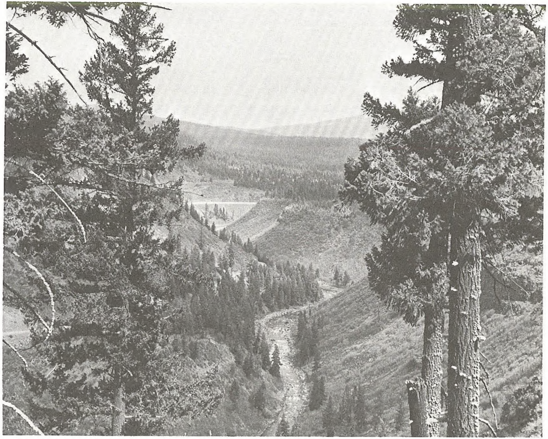


FIGURE II-48
Klamath River

FIGURE II-49
Existing 230 Kv Transmission Line
Proposed Route Would Parallel West of the Klamath River

The proposed right-of-way would cross Oregon State Highway 66, which had an annual daily traffic of 770 during 1973. With the exception of State Highway 66, the proposed right-of-way area is generally free of major man-made landscape intrusions. Scenery-sensitivity for this five mile segment is B-2.

Lookout to Medford Segment

Northwest from Lookout, the proposed right-of-way would cross moderately scenic (Class B) steep, sloping broken terrain with conifer, oak-grassland vegetative type on the west slope of the Medford-Ashland valley area.

It would cross the west slope of Breast Mountain, the east slope of Grizzly Peak and extend along the west slope of Antelope Creek canyon where several ranch-farm residences are located. (FIGURE II-50)

The area that would be crossed by this segment of the proposed right-of-way receives heavy deer hunting pressure.

This right-of-way segment would cross 3 secondary roads.

Scenery - sensitivity rating for this 18 mile segment is B-2.

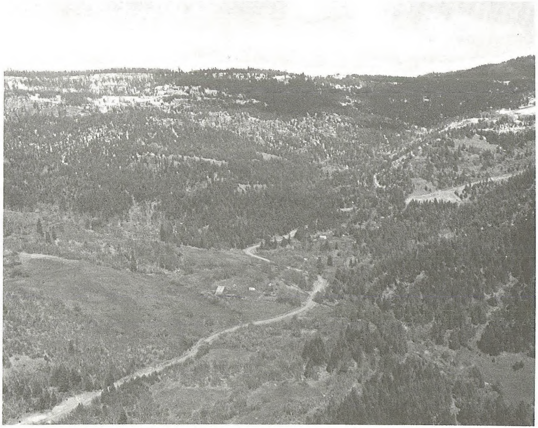


FIGURE II-50
Antelope Creek Area
Proposed Route to the Right of Photo

RECREATION RESOURCES

Midpoint to Malin

Recreation resources and use in the area that would be crossed by Pacific's proposed Midpoint to Malin 500 KV transmission line right-of-way can be divided into two broad categories, high desert and forest.

Approximately 90 percent of the area, including southwestern Idaho and southeastern Oregon, falls within the high desert category. The vast majority of these lands are administered by the Bureau of Land Management and to a lesser extent by the Fish and Wildlife Service. Availability of recreation visitor use data ranges from detailed (wildlife refuges, developed recreation sites) to non-existent (most of the area).

Recreational activities throughout this broad area are generally "extensive" in nature. In approximate order of importance based upon total use, these activities include:

Hunting	-	Deer, waterfowl and upland game
Fishing	-	Cold and warm water species
Camping	-	Generally self-contained units
Sightseeing	-	Primarily auto touring
Collecting	-	Primarily rock hounding
Nature Study	-	Unique zoological, botanical and geological features
Floatboating	-	Primarily Bruneau and Owyhee Rivers
Off-Road Vehicle Use	-	Primarily 4-wheel drive
All Other	-	Picnicking, hiking, riding, etc.

The Bureau of Land Management's Unit Resources Analysis (URA - Recreation) for the eastern Oregon portion of the high desert area, exclusive of the above Oregon areas, estimates 100,000 visitor days of primarily "extensive" recreation use annually on national resource lands.

Except for the areas noted in TABLE II-43, there is no data on recreational use of national resource lands in Idaho.

Approximately ten percent of the lands that would be crossed by the proposed Midpoint to Malin right-of-way would fall into the forest recreation resource and use category. The majority of these lands are within the Fremont National Forest which received a total of 209,000 visits and 397,100 visitor days of recreational use in 1973.

These activities are ranked below by percentage of total use.

Camping	-	38.4%
Fishing	-	20.1%
Driving for Pleasure	-	16.2%
Hunting	-	11.8%
Picnicking	-	3.8%
Snow Sports	-	2.4%
All Other (Boating, Hiking, Horseback Riding, Swimming, Collecting, Nature Study, etc.)	-	7.3%

TABLE II-43

ANNUAL VISITOR USE - MIDPOINT TO MALIN

Area	Year	Day Use Attendance	Camper Nights	Visitor Days	No. Float Trips	No. of People	Visits
U.S. FOREST SERVICE							
Fremont National Forest	1973						
Bly Ranger Dist.				61,200			13,600
Lakeview R.D.				86,900			89,900
Paisley R.D.				136,300			59,200
Silver Lake R.D.				112,700			46,300
Total				397,100			209,000
Warner Ski Area	1974			5,500			
NATIONAL PARK SERVICE							
Lava Beds N.M.	1975						137,000
NATIONAL WILDLIFE SERVICE							
Malheur Nat. Wildlife Refuge (Ore)	1973						38,214
Hart Mtn. N.W.R. (Ore)	1974						23,326
Tule Lake N.W.R. (Calif)	1975						192,000

TABLE II-43

ANNUAL VISITOR USE - MIDPOINT TO MALIN

Area	Year	Day Use Attendance	Camper Nights	Visitor Days	No. Float Trips	No. of People	Visits
Lower Klamath N.W.R.	1975						75,000
Upper Klamath N.W.R. (Ore.-Calif.)	1975						17,700
Deer Flat N.W.R. (Ida)	1973						122,365
Snake River N.W.R. (Ida)							
BUREAU OF RECLAMATION							
Owyhee Reservoir (Ore) *	1974			163,135			
BUREAU OF LAND MANAGEMENT							
Steens Mtn. Rec. Lands (Ore)	1974			400,000			
Cow Lakes Rec. Site (Ore)	1974			2,000			
Antelope Res. Rec. Site (Ore)	1974			5,000			
Twin Springs Rec. Site (Ore)	1974			3,000			

* Includes Lake Owyhee State Park

TABLE II-43

ANNUAL VISITOR USE - MIDPOINT TO MALIN

Area	Year	Day Use Attendance	Camper Nights	Visitor Days	No. Float Trips	No. of People	Visits
Leslie Gulch Rec. Site (Ore)	1974			30,000			
Owyhee River (Ore)	1974						
Rome to Reservoir					52	367	
Three Forks to Rome					13	80	
Gerber Res. Rec. Site (Ore)	1974			14,000			
Chickahominy Res. Rec. Site (Ore)	1973			16,000			
Birds of Prey Nat. Area (Ida)	1974			5,000			
Silver City Hist. Site (Ida)	1973						35,000
C. J. Strike Res. (Ida)	1974						50,000
Cove Rec. Site	1974						10,000
Black Sands Resort (Ida)	1974						20,000

TABLE II-43

ANNUAL VISITOR USE - MIDPOINT TO MALIN

Area	Year	Day Use Attendance	Camper Nights	Visitor Days	No. Float Trips	No. of People	Visits
Bruneau River (Ida)	1974						50,000
Bruneau Overlook	1974						3,000
Indian Bathtubs	1974						1,000
STATE PARKS							
Lake Owyhee S.P. (Ore)	73-74	58,682	4,674				
Succor Creek S.P.(Ore)	73-74		1,308				
Bruneau Sand Dunes (Ida)	1973						63,298
Three Island Crossing (Ida)	1973						112,723
Malad Gorge S.P. (Ida)			No Data Available				

TABLE II-43 summarizes available visitor use data for the overall general southwestern Idaho and southeastern Oregon area that would be crossed by Pacific's proposed Midpoint to Malin 500 KV transmission line right-of-way.

Recreational use identified in the preceding discussion occurs in varying degrees in and adjacent to the area that would be crossed by the proposed right-of-way. Use of the area that would be within the proposed right-of-way cannot be quantified because it is a lineal portion of several larger, homogenous use areas.

The relationship of recreational use areas and various activities to esthetic sensitivity are discussed in the preceding Esthetics section.

Recreation facilities and areas including state parks, wilderness areas, roadless study areas, natural areas, scenic waterways, Wild and Scenic study rivers and recreational sites are depicted on Recreation Maps A-3 and B-3 in the Appendix of the Draft Statement.

The following discussion describes by right-of-way segment the recreational activities, opportunities, facilities and areas in the area that would be crossed by the proposed Midpoint to Malin 500 KV transmission line right-of-way.

Midpoint to Hagerman Segment

Primary recreation activities and opportunities include sightseeing, picnicking, fishing and waterfowl hunting on the Snake River at Lower Salmon Falls Dam. The proposed right-of-way would cross immediately adjacent to a small picnic-boat launching recreation development at Lower Salmon Falls Dam. Other recreation uses and opportunities include general off-road vehicle use and small game hunting.

It would cross the Snake River approximately 1.25 miles south of Malad Gorge State Natural Park and 1.5 miles north of the proposed Hagerman Fossil Beds National Monument.

Hagerman to Owyhee Junction Segment

Primary recreation uses and opportunities include sightseeing, nature study, photography, picnicking, fishing and other day-use recreation activities at the Bruneau Sand Dunes State Natural Park; sightseeing, boating, fishing, waterfowl hunting, camping, picnicking and related activities on the Snake River, including C. J. Strike Reservoir, deer hunting, upland gamebird hunting, trout fishing, camping, riding, hiking, and "spillover" sightseeing and backcountry exploration from the Silver City Historic Site in the Owyhee Mountains; camping, fishing and waterfowl hunting at Antelope Reservoir. Other recreation uses and opportunities include general off-road vehicle use, small game hunting and sightseeing along the overall route segment.

The proposed right-of-way would pass south of and generally parallel to the Snake River, passing 3 miles south of Three Island Crossing State Historic Park, less than 1 mile south of Bruneau Sand Dunes State Natural Park and 4 miles south of the southern extremity of C. J. Strike Reservoir.

It would pass 12 miles south of Silver City Historic Site, cross portions of two Bureau of Land Management "Back Country Study Areas" in the Owyhee Mountains and pass less than two miles south of Antelope Reservoir.

Owyhee Junction to Catlow Junction Segment

Primary recreation uses include whitewater floatboating and sightseeing on the Owyhee River; sightseeing, backpacking, and deer, antelope and upland game bird hunting in the Long Hollow - Alvord Desert areas and sightseeing viewing from Steens Mountain summit scenic overlooks. Other recreation uses and opportunities include general off-road vehicle use, small game hunting, sightseeing and nature study along the overall route segment.

The proposed right-of-way would cross the Owyhee River which is under consideration for inclusion in the National Wild and Scenic Rivers System. The Bureau of Outdoor Recreation is presently making a study of the Owyhee River as required in Section 5(a) of the Wild and Scenic Rivers Act, P.L. 90-542, as amended. The study tentatively recommends legislative action to include the 171-mile segment from the Duck Valley Indian Reservation in Idaho, downstream to the Owyhee Reservoir in Oregon, under administration of the Bureau of Land Management and the State of Oregon.

The proposed right-of-way would pass a minimus of 21 miles southeast of the Steens Mountain Recreation Lands scenic overlooks and at least 14 miles southeast of the Steens Mountain roadless study area. The route would cross a minimum of four miles north of the Bureau of Land Management Pueblo Mountains roadless study area and cross the proposed High Desert Trail in the Long Hollow area.

Catlow Junction to Malin Segment

Primary recreation uses include deer and antelope hunting in the Catlow Valley - Beatty's Butte area; sightseeing, nature study, photography, fishing, camping and waterfowl hunting -- observation in the Warner Valley area; sightseeing, riding and hiking, forest product collection, deer hunting and skiing - snow play activities in the Warner Mountains (Fremont National Forest) area; waterfowl hunting and observation in the Goose Lake Valley area; sightseeing, deer hunting, waterfowl hunting, camping and fishing (Warner Lakes, Priday Reservoir and Willow Valley Reservoir) in the area between Goose Lake Valley and Malin Substation, including the Fremont National Forest. Other recreation activities include general off-road vehicle use, small game hunting, sightseeing, forest product collecting and nature study along the route segment.

Between Catlow Junction and Beatty's Butte the proposed right-of-way would cross a Bureau of Land Management roadless study area. It would cross immediately adjacent to the south base of Hart Mountain and pass less than one mile south of the Stone Bridge National Historic Site. It would cross immediately north of Priday Reservoir, cross the northern extremity of

Fish Creek Rim in the Warner Valley area, pass less than one mile south of the Warner Ski Area in the Warner Mountains (Fremont National Forest) area, and immediately south of Willow Valley Reservoir in the Langell Valley area on to the Malin Substation.

Malin to Medford

Recreation resources and use in the area that would be crossed by Pacific's proposed Malin to Medford 500 KV transmission line right-of-way can be divided into two broad categories, Klamath Basin and Southern Cascade Mountains.

Major recreation activities in the Klamath Basin include waterfowl hunting and observation, warm water fishing and sightseeing.

Major recreation activities and opportunities in the Southern Cascade Mountains include deer hunting, trout fishing, boating and swimming, hiking, camping, forest product collection, and sightseeing.

TABLE II-44 summarizes all annual visitor use data available for the general area that would be crossed by Pacific's proposed Malin to Medford 500 KV transmission line right-of-way.

Recreational activities and opportunities identified in the preceding discussion occur in varying degrees in and adjacent to the area that would be within the proposed right-of-way. Use of the area that would be within the proposed right-of-way cannot be quantified because it is a lineal portion of several larger, homogenous use areas.

The relationship of recreational areas and various activities to esthetic sensitivity are discussed in the preceding Esthetics section.

Recreation facilities and areas are illustrated on Recreation Map B-3 in the Appendix of the Draft Statement. No developed recreation facilities would be directly impacted by the proposed right-of-way.

TABLE II-44

ANNUAL VISITOR USE - MALIN TO MEDFORD

Area	Year	Visits	Visitor Days
Bureau of Land Management			
Topsy Rec. Site	1974	4,000	7,000
Surveyor Rec. Site	1974	1,000	1,500
Hyatt Lake Rec. Site	1973	47,000	75,000
Jackson County Parks			
Emigrant Lake	1973	353,200	
Howard Prairie	1973	475,000	
Klamath River		30,000	

The following discussion describes by right-of-way segment the recreational activities, facilities and areas in the area that would be crossed by Pacific's proposed Malin to Medford 500 KV transmission line right-of-way.

Malin to Stukel Segment

Limited deer and small game hunting are the primary recreation activities. No major facilities are located adjacent or in close proximity to the proposed right-of-way.

Stukel to Green Springs Segment

Primary recreation activities include migratory waterfowl hunting observation and warm water fishing in the Klamath Basin; trout fishing in the Klamath River; deer hunting and general sightseeing. Construction of the Pacific Crest Trail would stimulate additional recreational use, including hiking and horseback riding.

Green Springs to Lookout Segment

Primary recreation activities include deer hunting and sightseeing from State Highway 66.

Lookout to Medford Segment

Primary recreation activities include deer-small game hunting and general sightseeing.

SOCIOECONOMIC CONDITIONS

Midpoint to Malin

Pacific's proposed Midpoint to Malin 500 KV transmission line would cross Jerome, Gooding, Twin Falls, Elmore and Owyhee Counties in Idaho, and Malheur, Harney, Lake, and Klamath Counties in Oregon. Ada and Canyon Counties in Idaho would very probably be affected because of their proximity to the proposed power line.

The seven counties in Idaho and the four counties in Oregon are not homogenous in social and economic characteristics, but share many similarities. With the exception of Ada and Canyon Counties, Idaho, and Klamath County, Oregon, the counties which would be crossed by the proposed power line are generally characterized by low population density, slow population growth, economies based largely on farms and ranches, per capita incomes lower than the average for the state and nation, a few relatively small and widely scattered towns, and relatively high percentages of land in Federal ownership.

Ada and Canyon Counties in Idaho both have high population densities, rapid population growth, diversified economic bases and relatively high per capita incomes.

Boise, in Ada County, is the only Standard Metropolitan Statistical Area (SMSA) potentially affected by the proposed 500 KV transmission line. Boise is the capital city and the largest urban area in the state. The economic and social characteristics of the Boise SMSA are quite different from those of the other Idaho and Oregon counties potentially affected by the proposed power line. Klamath County is more densely populated than the southeastern Oregon counties. Its economy is based on lumber and wood products, recreation and agriculture. The county is more closely allied to the coastal Oregon counties than are the southeastern counties. A summary of the published data upon which this section is based is available upon request to the Bureau of Land Management, Portland, Oregon.

Population

The total population of the eleven counties increased from 321,455 in 1960 to 344,872 in 1970--a 7% increase. Population of the seven Idaho counties increased 8.7% while Idaho's overall population increased 7.3%. Most of Idaho's growth in recent years has been along the Snake River--particularly in the Boise-Nampa-Caldwell area. Population of the four Oregon counties increased only 3% while Oregon's overall population increased 18% from 1960 to 1970. Most of Oregon's growth has been west of the Cascades--particularly in the northwest.

In Idaho, Jerome and Gooding Counties declined 12% and 9% respectively between 1960 and 1970, but have shown increases since the 1970 Census. Twin Falls County remained stable between 1960 and 1970 and has shown modest population growth since 1970. Owyhee County increased about 1% during the 1960-1970 period, but this amounted to only 47 persons. Ada County showed the greatest increase in this period with 20% or an additional 18,770 persons.

In Oregon, Lake County decreased 11% in population from 1960 to 1970. The population in the county has increased since the 1970 census, but the population is still below the 1960 level. Although Harney County increased about 7% between 1960 and 2970, population declined about 2% between 1970-1973. Southeast Oregon and southwest Idaho have both shown net outmigrations in the period 1950-1970. It appears that in the late 1960's these trends were beginning to change. Current population data indicates most of the predominantly rural counties are now holding their own, or showing net in-migration. Demographers now believe the strong rural to urban population movement may have slowed, and in some cases reversed itself.

The area 10 to 20 miles either side of the proposed route for the 500 KV powerline is predominantly rural with low population densities. Generally, population density is from less than one to about three persons per square mile along most of the proposed route. The town of Lakeview is an exception, since the proposed power line would pass within about five miles of the town.

1974 populations of the communities in the vicinity of the proposed power line are listed in TABLE II-45.

TABLE II-45
COMMUNITIES POTENTIALLY AFFECTED BY PROPOSED RIGHT-OF-WAY

Community	Population	Community	Population
		IDAHO	
Bliss	114	King Hill	100
Boise	74,990	Kuna	593
Bruneau	100	Marsing	610
Buhl	2,975	Melba	197
Caldwell	14,219	Meridian	2,616
Eden	343	Mountain Home	6,451
Filer	1,173	Murphy	76
Glenns Ferry	1,386	Nampa	20,768
Gooding	1,599	Oreana	25
Grandview	260	Payette	4,521
Hagerman	436	Shoshone	1,233
Hammett	200	Tuttle	25
Homedale	1,411	Twin Falls	21,914
Jerome	4,183	Wendell	1,122
		OREGON	
Fields	5	Merrill	745
Jordan Valley	196	Plush	25
Lakeview	2,705	Rome	8
Malin	486	Worden	50

Employment

Southwestern Idaho and southeastern Oregon are characterized by "wide open spaces" for which the West is noted. Cattle and sheep ranching, farm operations, and food processing are typical of this area. Although long-term trends have been toward fewer, larger farms and ranches with decreasing labor requirements, agriculture is still the major source of employment.

The economy of southwestern Idaho, and the state as a whole, is based on agricultural production. Agriculture, mining, and lumber have been primary industries for many years, and agriculture is first in cash receipts followed by forest products, manufacturing, tourism and mining. With the exception of Ada County, agriculture is the basic industry in the seven Idaho counties. Data from 1970 shows agriculture was the leading employer in Jerome, Gooding, and Owyhee Counties, and second in Twin Falls and Elmore Counties. In Canyon County, agriculture employment was a close third in 1970.

The Boise metropolitan and suburban areas reflect a diversified economy. Since Boise is the state capital and county seat, government is a major employer with an average of 11,700 employees per month in 1972. (Idaho Department of Employment, November 1973). Boise is a distribution point for a relatively large area and the manufacturing and service industries rank as major employers. Manufacturing has only recently become a major employer with expansion of the lumber and wood products industry, food processing and the construction of mobile homes, campers and trailers.

Manufacturing is closely linked to agricultural production and employment. Over one-third of all manufacturing employment in 1970 was in the food and kindred sectors. Farming and food processing together provide over one-fifth of total civilian employment.

In recent months unemployment in Idaho has increased to over 8%. Unemployment in individual counties that would be affected by the proposed right-of-way have exceeded 9%. Unemployment rates in other areas of the nation have fostered some migration to southwestern Idaho which has influenced unemployment.

Malheur, Harney, and Lake Counties in southeastern Oregon have over 20% of the labor force employed in agriculture. Ten percent of Klamath County's labor force is employed in agriculture. Employment in manufacturing also includes the food processing industry, primarily in Malheur County, which is an outgrowth of the agriculturally oriented economy. Agriculture is the leading source of employment in Malheur and Lake Counties and second only to the manufacturing industry in Harney County. Unemployment in Malheur County was reported to be a quite low 4.5% in 1970 while averaging 7.4%, 8.4% and 6.4% in Harney, Lake and Klamath Counties, respectively. In recent months the Malheur County unemployment rate has risen, but is still below the state and national averages. These four counties represent only about 4% of all employment in Oregon but contain 36% of the state land area.

An examination of regional labor force participation rates for men and women indicates employment rates for women have been consistently lower than the national average. However, the picture has changed in recent years. In

the urban areas of Twin Falls, Ada and Canyon Counties, for example, more than 40% of the women over 16 years of age have entered the labor force. In rural areas the rate of entry is substantially lower. (Bollinger, Unpublished.)

A major factor in southwestern Idaho and southeastern Oregon is the location of food processing plants. Historically, about two-thirds of the employees are women. Food processing has drawn workers from the predominantly rural Jerome, Owyhee, Payette and Malheur Counties. About 40 people are enployed in food processing for every 100 workers in agriculture.

Industry Income

The economy of southwestern Idaho is based largely on agricultural production. An analysis of economic activity in 1970 reveals about 20% of industry earnings were derived from agriculture and about 10% from manufacturing which includes food processing. Contract construction accounted for about 6% and public utilities about 1.5% of industry income. Principal crops are potatoes, wheat, and sugar beets. Cattle, calves, sheep, and dairy products are also important sources of the agricultural industry income. Input-output studies for Idaho (Hamilton, 1971) and studies of gross state output (Lynch, 1971) indicate that one-fifth of Idaho's gross state products are derived directly from agriculture. For southwestern Idaho, this data is comparable.

The economy of Owyhee County is based largely on livestock, and crop production is also important. Wage and salary data for the county (Ballinger, 1975) shows 31% of all wages and salaries are derived from agriculture. Similarly, Gooding County showed 12% of wages and 20% of Jerome County wages were from agriculture. Although agriculture is important in Twin Falls County, only 6% of wages were from agriculture due to the diversified economy of the county. The economy of Elmore County is very strongly influenced by the presence of Mountain Home Air Force Base. About 75% of all wages and salaries in the county are from the government sector.

Canyon County showed about 9% of wages from agriculture and 30% from manufacturing, which includes the food processing sector. Ada County shows the most diversified economy of any of the seven Idaho counties potentially affected by the proposed power line. Boise is a state and regional center for both state and federal government, and 28% of wages and salaries are derived from the government sector. Boise is also a region trade center with many regional or division headquarters for a variety of industries. Wholesale and retail trade provided 23% of wages and services account for about 12%.

In the four southeastern Oregon counties, the economy is based largely on agriculture, particularly livestock production, lumbering and associated manufacture of forest products, hay and grain, recreation and tourism. The employment data in the previous section reflects the county economies' strong agriculture and timber orientation.

The economy of Malheur County is based on agriculture, food processing and recreation. In recent years, over 95% of the value added by manufacturing in the county was from food processing. Agricultural sales in 1970 totaled

$43 million with crops sales contributing $23 million and beef cattle $15 million. Much of the 4,500 acres of fresh vegetables and over 21,000 acres of potatoes raised in the county are processed for distribution. Sugar beets are produced and refined in the county (Oregon State University, Resource Atlas; 1972, 73, 74.)

Harney County is known for its cattle ranching. Lumbering and recreation are also important sources of income. In 1970, 83% of the reported $8.2 million in agricultural sales was from cattle sales. Crop sales amounted to almost $1 million and other meat animals represented sales of $250,000 or about 3% of all agricultural production (Ibid.).

Lake County's two major industries are agriculture and lumbering with most people in manufacturing employed by the lumber and wood products industry. In 1970, over $8.3 million in sales was from agricultural products. About 77% of these sales or $6.3 million was beef cattle sales and an additional $1.6 million was reported for crops sold (Ibid.).

The economy of Klamath County is based on agriculture, lumbering and recreation with most people engaged in manufacturing employed by the lumber and wood products industry. In 1970, $27 million in sales was derived from agriculture. Beef cattle represented 50% of all agricultural production with sales totaling $13.7 million and crop sales accounted for about $10.8 million (ibid.).

Personal Income

Per capita personal income in the seven Idaho counties in 1970 was below the state average of $2,721 except for Ada County where per capita income was $3,146. A comparison of per capita income by county to the state average shows Ada County leading at 1.16 with Jerome and Owyhee Counties relatively low at .79 and .63 respectively.

Median family income was below the state average of $8,381 in 1970 except for Ada County. Families with incomes below $5,000 varied from a high of 43% in Owyhee County to only 17% in Ada County. About one-third of the Ada County families had incomes of over $12,000 per year compared to a low of about 11% of the families in Owyhee County.

Per capita personal income in the four Oregon counties in 1970 was below the state average of $3,163. Per capita personal income was .75 in Malheur, .92 in Harney, .85 in Lake and .92 in Klamath Counties compared to the state average in 1970. Similarly, median family income in the four counties was below the state average of $9,489.

Personal income for families was less than $5,000 in about one out of every five families in the southern four Oregon counties in 1970. In Malheur County 30% of the families received less than $5,000 in 1970. The percentage of families having incomes below the poverty level was 16% in Malheur, 5.4% in Harney, 12.3% in Lake and 10% in Klamath Counties. Over 20% of the families in these counties had incomes of $12,000 or more for 1970.

With the exception of Ada County, personal income on a per capita basis for the 11-county area was below the average for the state and well below the national per capita income average in 1970.

Public Finance and Tax Base

Predominantly rural counties with relatively low population densities appear to pay more taxes but get less for their money. Per capita state and local taxes are somewhat higher in the rural counties, yet benefits financed from the revenue are usually less than those of more populous and prosperous counties. People in more populous counties benefit from a wider range of services and lower per-household costs than those in thinly populated areas.

In 1973, per capita state and local taxes per $1,000 in income averaged $120.53 in Idaho and $126.73 in Oregon. The per capita yield of state and local taxes for fiscal year 1973 was $447.39 in Idaho and $532.78 in Oregon. In Idaho, 65% of taxes are collected by the state and 35% at the local level (Idaho Department of Revenue and Taxation, 1974). In Oregon, about one-half the tax is collected by the state and the other half locally.

Malin to Medford

This portion of Pacific's proposed 500 KV transmission line right-of-way would cross southern Klamath and Jackson Counties in Oregon. Although Jackson County is about one-third the size of Klamath County and has a population about twice as large, the counties are similar in many ways. Both counties are predominantly forested including more than 75 percent of Klamath County and about 87 percent of Jackson County. About half of these forested lands are in Federal ownership. The economy of both counties is based on lumbering and agriculture, but recreation and tourism are also important.

Population

The population of Klamath County increased from 47,475 in 1960 to 50,021 in 1970 - an increase of 5 percent. Since 1930, Klamath County has experienced much lower rates of population increase than Jackson County. Jackson County population increased 26 percent from 1960-1965; Klamath County increased 1.3 percent. The 1970 Census showed almost 20 percent net in-migration in Jackson County from 1960-1970, but a net out-migration of 7 percent in Klamath County.

From 1960 to 1970, the population of Jackson County increased from 73,962 to 94,533 - a 28 percent increase. Population growth was phenomenal following the Second World War - it increased 66 percent from 1940 to 1950 and 26 percent from 1950 to 1960. From 1960 to 1970, Oregon's population increased 18 percent and the nation 13 percent. The population of Jackson County was estimated at 100,100 in 1972. Population density was about 38 persons per square mile. In 1970 about 60 percent of the population in both Klamath and Jackson Counties lived in urban areas and 40 percent in rural areas.

Klamath Falls is the largest city in Klamath County; 1972 population was 15,815. Medford was the largest city in Jackson County with 31,000 people in 1972. TABLE II-46 provides population estimates for selected incorporated areas in both counties.

Employment

The forest and agricultural lands of Klamath and Jackson Counties provide much of the economic base. In 1970 almost 18 percent of Klamath County's labor force was employed in wood products manufacturing and 10 percent in agriculture. About 13 percent of Jackson County's labor force was employed in wood products manufacturing and 8 percent in agriculture.

The 1970 Census showed a labor force of 20,146 persons in Klamath County, or about 40 percent of the population, and an unemployment rate of 6.4 percent. Seasonal workers not included in these data varied from 60 to 500, averaging about 200 workers per month. The census showed a labor force of 35,664 for Jackson County, which represented 38 percent of the total population. Unemployment at that time was reported to be 8.84 percent or 3,151 workers. The census did not include seasonal workers in agriculture from June through September, which varied from 100 to 400 people in 1970.

Klamath County employment trends indicate a gradual decrease in agricultural employment and nearly constant employment in lumber and wood products manufacturing. Jackson County shows a slight increase in agricultural employment with employment in manufacture of forest products fluctuating somewhat but relatively constant. In both counties, there has been a trend toward more employees in the trade and service industries. In 1970, contract construction employed about 5 percent of the labor force in both counties.

Income

Agriculture, forest products, and recreation and tourism are major sources of income in Klamath County. The forest products industry generates about $18 million annually for 3,000 persons. In 1970, the value of all agricultural products sold was more than $27 million with beef cattle accounting for $13.7 million. Klamath County ranks first in the state for alfalfa production and second in barley. In 1971, Klamath was the state's top potato producing county.

In 1970, there were 50 logging firms, 16 sawmills and planning mills, 8 veneer and plywood mills and 9 other mills operating in Jackson County. The annual payroll generated in 1970 was about $45 million. Pear production, beef cattle and dairying are also important sources of industry and personal income. Income from the sale of crops, livestock and other farm products was reported at about $15.8 million for 1970. Fruits accounted for about 35 percent of the agricultural income and livestock products 57 percent. Tourism including hunting, fishing, boating and other outdoor activities also made significant contributions to county income.

Personal income in both Klamath and Jackson Counties has been somewhat below the average Oregon per capita income. Census data for 1970 showed per capita personal income was $2,919 and $2,888, respectively, compared to $3,163 for Oregon. Median family income was $8,645 and $8,574 in the counties and

TABLE II-46

POPULATION ESTIMATES FOR KLAMATH AND JACKSON COUNTY COMMUNITIES

City and County	1960	1965	1971	1972
Klamath County	47,475	48,100	50,500	51,940
Bonanza	297	287	225	230
Chiloquin	945	910	830	830
Klamath Falls	16,949	17,600	15,800	15,815
Malin	568	560	510	515
Merrill	804	848	740	745
Incorporated Areas	19,563	20,205	18,105	18,135
Unincorporated Areas	27,912	27,895	32,395	33,805
Jackson County	73,962	95,000	97,620	100,100
Ashland	9,119	12,200	13,000	13,980
Butte Falls	384	389	396	400
Central Point	2,289	3,800	4,180	4,390
Eagle Point	752	1,040	1,350	1,535
Gold Hill	608	600	625	670
Jacksonville	1,172	1,364	1,780	1,915
Medford	24,425	29,300	30,150	31,000
Phoenix	769	1,140	1,370	1,425
Rogue River	520	660	840	845
Talent	868	1,310	1,650	2,000

Source: Center for Population Research and Census.

$9,489 in Oregon. About 25 percent of the families had personal incomes over $12,000 while over 20 percent had incomes below $5,000.

Public Finance and Tax Base

Per capita state and local taxes tend to be somewhat higher in rural counties, yet benefits financed from the revenue are less than those of more populous and prosperous counties. The more densely populated counties enjoy a wider range of services and costs per houshold tend to be lower.

In 1973 per capita state and local taxes per $1,000 in income averaged $126.73 or a per capita yield of $532.78. About one-half the tax is collected by the state and the other half locally. Utility property is centrally assessed with distribution to counties dependent on length of transmission facilities.

Housing

Some information from the 1970 Census concerning housing is summarized in TABLE II-47. Klamath County showed about 9% of the available housing units were vacant as opposed to almost 6% in Jackson County. Klamath showed 59% of the housing was renter-occupied compared to 46% renter-occupied in Jackson County. A variety of hotel, motel, apartments, and mobile home space is available in the Klamath Falls-Medford area. An inventory of all such accommodations was not made, and a complete listing of them is not available.

Utilities

Both water and sewers are provided in Klamath Falls. About 30 percent of Klamath County residents rely on septic tanks. About 70 percent of the county residents are provided with water by either a public system or private company. Medford and Ashland are served by city water and sewers. A public water system or private water company provides water to about 70 percent of Jackson County residents. About 40 percent of the county residences use septic tanks.

Both Klamath and Jackson County receive electric power from Pacific Power and Light Company facilities. Information concerning electric power use is discussed in the Market Area portion of this chapter.

Telephone service in Klamath County is provided by Beaver State Telephone Company and United Telephone Company of the Northwest. Klamath County has a cable TV station in Klamath Falls and four radio stations. Telephone service is proved by United Telephone Company of the Northwest and by Public Northwest Bell in Medford and Ashland. The Medford--Ashland area has two television stations and nine radio stations.

Education

Klamath County has 24 elementary, three junior high and seven high schools with 1971 enrollments of 6,479, 1,442 and 3,740 students respectively. The numbers of students in the county increased from 11,167 in 1969 to 11,761 in 1971. Oregon Technical Institute, offering two to four-year programs, had a 1971 enrollment of 1,598 of which 514 students were residents of Klamath County.

TABLE II-47

1970 HOUSING STATISTICS - KLAMATH & JACKSON COUNTIES

Subject	Klamath		Jackson	
	Numbers	Percent	Numbers	Percent
Occupancy				
All housing units	18,317	100.00	33,562	100.00
Vacant-seasonal or migratory	373	2.00	228	.67
Owner occupied	10,278	56.10	21,481	64.00
Renter occupied	6,029	32.90	9,903	29.50
Vacant year round	1,637	8.90	1,950	5.81
Population in housing units per unit				
Owner occupied	2.5		3.0	
Renter occupied	2.5		2.8	
Persons per room				
All occupied units	16,307	100.00	31,384	100.00
1.00 or less	15,064	92.40	29,438	93.79
1.01 to 1.50	979	6.00	1,550	4.93
1.51 or more	264	1.60	396	1.26
Facilities				
Lacking some or all plumbing facilities	961	5.20	903	2.69
Telephone available	13,902	85.30	27,810	88.61
Air Conditioning	1,163	7.10	8,508	25.53
Median number of rooms	4.6		4.9	
Median value 1/	$12,400		$14,900	
Median gross rent 2/	$ 93		$ 103	

1/ Specified owner occupied. Limited to one family homes on less than 10 acres.

2/ Specified renter occupied. Excludes one family homes on 10 acres or more.

Source: U. S. Bureau of the Census, 1972.

Jackson County has 37 elementary, five junior high and eight high schools with 1971 enrollments of 11,224, 3,590 and 5,643 students respectively. Student enrollment decreased from 21,029 in 1969 to 20,457 in 1971. Most of the decrease was in the senior high school grades.

Southern Oregon College is located in Ashland and offers degrees in Business, Education and 16 areas of Liberal Arts and Sciences. Master's Degree programs are offered in Education, Humanities, Science and Social Studies. The Fall 1972 enrollment was 4,500 students compared to Spring 1973 enrollment of 4,111. About 1,900 Jackson County residents are enrolled in Southern College (Oregon State University, 1973).

Health

Klamath County health facilities consist of one general hospital, three long-term care units and one diagnostic and treatment center - all located in Klamath Falls. The general hospital needs additional capacity. The ratio of medical personnel (doctors, RN's, dentists) to population is about 1 to 1,300 except for nurses, which approximates 1 to 400. Health statistics indicate that diseases and deaths from all causes are generally lower than the average for the state except for congenital anomalies, infant mortality and homicides.

Jackson County has five general hospitals, 12 long-term care units (two in hospitals) and three diagnostic and treatment centers. Health facilities are generally considered adequate, but some additional space is needed in long-term care units. There are more medical personnel for the population than the state average. Health statistics are comparable with the state's averages for diseases and cause of death with slightly higher rates for cancer and heart diseases.

Law enforcement and fire protection facilities and services appear to be adequate for the communities, but rural families are frequently beyond the effective service areas.

Community Size Classes

Since the proposed power line from Midpoint to Malin to Medford could influence communities from as small as five persons to urban areas of over 100,000 persons, some classification or aggregation would facilitate an assessment of impacts in Chapter III. Such a classification would avoid estimating impacts of the proposed power line on each city or community which could possibly be affected. For simplicity, the following discussion categorizes communities in three size classes.

1. Populations below 400
2. Populations from 400 to 4,000 and
3. Populations of more than 4,000

The communities which could be affected by the proposed power line are listed by these size classes in TABLE II-48. The relative size of a given community is important in assessing impacts since it appears the larger a city or community, the more easily increased short-term economic and social activity can be absorbed.

TABLE II-48

COMMUNITY SIZES

Less than 400

Bliss, ID	114	Hammett, ID	200	Oreana, ID	25
Bonanza, ID	230	Jordan Valley, OR	196	Plush, OR	25
Bruneau, ID	100	King Hill, ID	100	Rome, OR	8
Eden, ID	343	Melba, ID	197	Tuttle, ID	25
Fields, OR	5	Midland, OR	300	Valley Falls, OR	15
Grandview, ID	260	Murphy, ID	25		

400 to 4,000

Buhl, ID	2,975	Hagerman, ID	436	Marsing, ID	610
Butte Falls, OR	400	Homedale, ID	1,411	Meridian, ID	2,616
Falcon Heights, OR	722	Jacksonville, OR	1,915	Merrill, OR	745
Filer, ID	1,173	Keno, OR	1,389	Phoenix, OR	1,389
Glenns Ferry, ID	1,386	Kuna, ID	593	Rogue River, OR	845
Gold Hill, OR	670	Lakeview, OR	2,705	Shoshone, ID	1,233
Gooding, ID	2,599	Malin, OR	486	Talent, OR	2,000
				Wendell, ID	1,122

Over 4,000

Ashland, OR	12,342	Jerome, ID	4,183	Nampa, ID	20,768
Boise, ID	74,990	Klamath Falls, OR	15,775	Payette, ID	4,521
Caldwell, ID	14,219	Medford, OR	28,454	Twin Falls, ID	21,914
Eagle Pt., OR	4,004	Mtn. Home, ID	6,451		

Several communities with populations below 400 persons could be affected by the proposed right-of-way. These very small Idaho communities include Tuttle, 25; Bliss, 114; King Hill, 100; Bruneau, 100; Murphy, 75; and Oreana, 25. Very small Oregon communities include Jordan Valley, 196; Rome, 8; and Plush, 25.

These small communities are generally made up of people engaged in agriculture or retail sales and services and who have lived in the community for some time. Housing is usually limited and utilities (water, electricity, sewerage) have little, if any reserve capacity for growth. Services of all kinds are generally no more than marginally adequate for the community. Hotels, motels, cafes, grocery stores and mobile home facilities are either quite limited or lacking.

Due to location in close proximity to the proposed power line route and a planned compensating station, a closer examination of Fields, Oregon appears appropriate. Fields has one cafe--service station--grocery combination, about five permanent residents, and one elementary school with about 11 students enrolled. Three or four motel units are available and an addition is being planned. Improved roads lead to Fields from Folly Farm on State Highway 78 and from Frenchglen on State Highway 78 and from Frenchglen on State Highway 205. There is a sod airstrip near Fields. (Refer to FIGURE II-23)

There are a number of cities and towns in the area which vary in size from about 400 to 4,000 population. In comparison to the very small rural communities, these larger towns provide a wider range of goods and services and are somewhat more elastic to fluctuations in economic and social activities.

Housing is comparatively limited, but some vacant housing usually exists. Utilities generally have some reserve capacity that could be used to accommodate short-term growth. Hotels, motels, cafes, and other trade and service facilities exist, but variability between towns is so great that meaningful characterization is difficult. There is also considerable variability in the kinds and quality of services available, such as police and fire protection, health and medical facilities and schools.

Idaho communities of more than 4,000 population include Twin Falls, Mountain Home, Boise, Nampa, and Caldwell. With the exception of Boise, these cities have populations of 20,000 or less and are considered major population centers and trade areas.

Nearly 30,000 people live in Twin Falls, surrounding small communities, and rural farms near the city. Twin Falls, provides a comparatively wide range of goods and services. Although the percentage of vacant houses is not high, housing units and mobile home facilities appear to be more readily available than in very small communities and communities experiencing rapid population growth. The various utilities for Twin Falls appear to be adequate. The city has a wide range of social services and amenities expected in a community of its size.

The Medford-Ashland, Oregon area has a population of over 50,000 persons and is considered a major trade area and population center as is the Caldwell-Nampa, Idaho area. The Medford and Caldwell areas, though widely separate

geographically, share many similarities in the quality and quantity of available goods and services. The various social services and amenities of the areas are also comparable.

Mountain Home, Idaho and Klamath Falls, Oregon are smaller communities but are still considered prominent population and trade centers. Both communities are about 50 miles or more from other densely populated areas. These communities offer the basic range of goods and services.

Housing appears neither in very short supply nor readily available. Mountain Home has a high percentage of rental housing and mobile homes due to the influence of nearby Mountain Home Air Force Base. There are no known restrictions or limitations concerning the various utilities and the existing social services are reported to be adequate.

The Boise area has been designed as a Standard Metropolitan Statistical Area (SMSA) by the Bureau of the Census. The SMSA encompasses Ada County and included 112,230 persons in 1970. A 1973 estimate shows a population of 126,800. The Boise area is one of the fastest growing areas in the state and is the largest population center. Because of relatively rapid population growth, there has been a general shortage of housing in the Boise area. Apartments and small rental homes have been somewhat difficult to locate. The addition of some new trailer parks in the area has helped meet the demand for mobile home spaces. Generally, expansion of housing of various kinds is continuing. The Boise area offers a very broad range of goods and services. Social services and amenities are considered to be very adequate. Generally basic utilities are adequate for continued expansion.

PROBABLE FUTURE ENVIRONMENT WITHOUT THE PROPOSED PROJECT

Construction of the proposed project would have a direct affect on a 175-foot-wide strip of land for the entire 483 mile length between Midpoint, Idaho and Medford, Oregon. Secondary affects, such as those previously discussed relative to wildlife, esthetics, recreation, socioeconomic factors, etc., would be further reaching.

The following discussion relative to the probable future environment without the proposed project deals with that area that would be directly affected by the project, should it be constructed.

General

The climate, air quality, geology and topography, metaliferous mineral resources, soils, and water resources in the Midpoint-Malin-Medford proposed transmission line area would probably remain the same as in the existing environment and, with available information, they are not expected to undergo any significant change in the future without the proposed project.

Geothermal Resources

There has been increased emphasis on development of geothermal energy sources as a part of the push for "energy independence." There are areas in the vicinity of the proposed route that have been identified as "Known Geothermal Resource Areas." Lands are under lease for geothermal exploration in the Alvord Desert and in the vicinity of Vale, Oregon at the present time. Test holes have been drilled on private lands near Lakeview, Oregon.

While prospects for significant discoveries and subsequent development are uncertain and speculative, the possibility does exist. Any estimate as to probable development, and effect on the future environment of the area, would be totally unrealistic at the present time.

Noise

No future significant increases in ambient noise levels are foreseen along the proposed route. Potential geothermal development along the proposed route could increase ambient levels to some extent. Resulting increases in ambient noise levels, although unquantifiable at this time, are expected to be minor and of a highly localized nature.

Vegetation

Midpoint ot Malin

The area that would be traversed by Pacific's proposed Midpoint to Malin 500 KV transmission line right-of-way is characterized by small, widely separated communities and sparse settlement. The majority of the land is in public ownership, devoted to extensive--rather than intensive--uses. Due to the ownership pattern and inherent nature of the land, conditions are expected to remain generally stable for a relatively long period of time. No immediate or rapid chain of events can be foreseen that would induce any significant change to the vegetative resource.

There would undoubtedly be some conversion of shrub and juniper lands to grass lands by elimination of the shrub or juniper overstory (mechanical or chemical) and/or seeding to range forage grasses. BLM has conducted forage improvement projects in the past and will probably continue to conduct such projects on suitable sites in the future. The amount cannot be predicted with any certainty, but at present project fund levels it would probably be a very minor portion of those vegetative types.

There is also the possibility of the conversion of some rangelands in southern Idaho to agricultural lands. Public lands have been so converted in the past by development under the Desert Land Entry Act. At the present time, some 12 miles of the proposed route would cross lands that have been applied for under this Act. These applications have not been approved--and development depends on many factors, such as availability of water and economic feasibility. Again, the number of applications that may be allowed, or successfully developed if allowed, cannot be predicted at this time.

The proposed route also is in the vicinity of several areas that are under application for geothermal exploration and development. Such exploration and development would result in vegetative disturbance and/or removal. The geothermal prospects at this time are highly speculative, and the amount of probable disturbance is totally unpredictable.

Malin to Medford

As is the case with the Midpoint to Malin segment, land uses and basic vegetative resources are expected to remain substantially the same as at present, absent the proposed project.

The proposed route in this segment also is in the vicinity of areas of geothermal interest and potential. The remarks made in the discussion of the Midpoint to Malin segment are also applicable to this segment.

There has been an increase in residential subdivisions in recent years in the area around Medford and Ashland near the western terminal of the proposed route. This is predicted to continue in the future, with conversion of agricultural, range, and some forest lands to residential use. This trend could result in removal and/or alteration of the natural vegetative resource. The amount cannot be estimated with any certainty, and in any event would be a very minor portion of the total vegetative resource of the general area.

Wildlife

Midpoint to Malin

Without the project, change in existing wildlife populations and their required habitat, would evolve slowly. Since most of the proposed route lies within fairly remote areas and most of it is principally regarded as valuable for grazing, wildlife and recreation,

with some timber harvesting, little further development, except in few agricultural areas is anticipated. Continued "clean farming" practices would continue to reduce upland game habitat. Therefore, it does not appear that wildlife populations would fluctuate greatly during the next 20 or 30 years within the project area. With the concern recently being shown for non-game wildlife, especially those designated as threatened or endangered, some species numbers could be stabilized, or increased through protection and enhancement of habitat. Some however, may become extinct due to a combination of decreasing numbers and adverse habitat manipulation.

At the present time, mule deer numbers show a continuing decline. This situation is prevalent throughout most of the western states. Poor winter range condition is believed to be the chief contributing factor to this decline. Another chief contributing factor to the decline of mule deer is believed to be excessive grazing by livestock on deer summer and winter ranges (USFWS, 1976).

Most of the antelope found in this project area are at the marginal edges of their preferred ranges, and show little change in populations over the past several years. (Mace, 1972)

All of the project area is important raptor habitat. These birds need seclusion and abundant prey species. Several losses have been occurring in eagles through electrocution on the smaller R.E.A. rural power lines, by illegal hunting, by being struck by autos while scavenging vehicle killed deer and rabbits, and in being caught in steel traps set for bobcats and coyotes. The recently dedicated "Birds of Prey Natural Area" along the Snake River is a great help in maintaining habitat in that area, as are recent safeguards and modifications of rural power lines (Nelson 1974). It is anticipated that raptors will slowly decline in numbers in this area during the next 30 years.

Waterfowl are generally restricted to major marshlands and waterways. Little change in numbers is anticipated under the existing use of lands within the proposed project area. The Lower Klamath, and Warner Valley marshlands have been adversely affected by drought. Predictions for wetter and colder conditions for the rest of this centry would appear to be in these birds' favor.

Upland game species-doves, sage grouse, chukar partridge-are influenced by the development of waterholes, grass seedlings, and sagebrush manipulation. Little change is anticipated in their habitat throughout the project area. Sage grouse populations can be adversely influenced by removal of sagebrush on strutting and nesting areas. (Sage Grouse Committee, 1974). In some areas sage grouse populations are being expanded through water developments.

Fish populations should remain static. Anadromous species are denied use of the Snake River and its tributaries above Hell's Canyon. Resident species in both Lotic and Lentic situations do not appear to be adversely influenced by conditions presently existing within the proposed project area except by some cases of overgrazing, where riparian vegetation has been removed.

Many small birds, mammals, amphibians and reptiles are found along the project route. Unfortunately, very little is known about their populations and habitat prefernces. It is assumed their populations will remain static, in keeping with the assumptions made early in this section. Intensive inventories need to be conducted and habitat studies initiated to determine the species present and the limiting factors in their environment.

Malin to Medford

This area would probably change more within the next few years without the project than the Midpoint to Malin portion would. Increased hunter pressure, together with more access roads into this area would put additional pressure on game species. The encroachment of housing projects and individual homes along the west end of the route along Antelope Creek near Medford would probably increase. This would reduce wildlife and wildlife habitat in the vicinity of the housing developments, through construction of new roads and the resulting people use. This would adversely affect both game and non-game species.

Continued logging of old growth timber along the top of the Cascades would eventually remove the old growth habitat required by the northern spotted owl, hawks, pileated woodpeckers and other forest dwelling species. This change could probably occur within the next 20 years. Most wildlife species probably would not fluctuate greatly over the next 20 or 30 years. Some local deer populations may increase due to increased habitat being formed by timber harvesting. Mule deer on the east end of the route may continue to show declines as have all of eastern Oregon and other western states population. Blacktailed deer populations would probably remain relatively stable, as in the case of the Jenny Creek interstate herd.

The Klamath basin waterfowl populations along the Malin-Medford route should show little change during the next 20 to 30 years. Upland game, especially pheasants and quail may be detrimentally affected by the continuing trends toward clean farming throughout the Klamath basin.

Fish populations may show a slow decline due to continuing siltation from road construction, and industrial and domestic sewage pollution.

Unfortunately, little is known about the many small birds, mammals, amphibians and reptiles found along the route. Although they may fluctuate by individual species, no drastic changes are anticipated.

Archeological and Historical Values

Archeological and historical resources are nonrenewable and finite. Therefore, they can only decrease. Illegal collection of Indian artifacts, and vandalism of all types of cultural resources are increasing in spite of the efforts of land management agencies and concerned citizens to protect them. Even without construction

of the proposed transmission line, there is likely to be increasing theft or inadvertent destruction of these irreplaceable resources in sensitive areas. Increased access speeds up the process.

Land Use

Midpoint to Malin

Land uses in the vicinity of the proposed route have remained generally stable for the past several years. Due to the predominately public ownership pattern and the inherent nature of the country, it is expected that land uses would continue to remain fairly stable for a long time. Possible exceptions to the general outlook are as follows:

Agricultural Development

In the southern Idaho area there are many applications filed under the Desert Land Entry Act. Development under the Act would convert range lands into irrigated agricultural lands. A considerable acreage has been developed and patented in the past under this Act.

It cannot be predicted at this time how many of these applications may be allowed--or successfully converted to agricultural lands if allowed. The major factors limiting development are the availability of irrigation water and economic feasibility. The amount of range land converted to agricultural land would in any event be an insignificant amount of the total range land in the region. It might be of some local significance to small communities such as Bruneau.

Rural Subdivision

Subdivision of private lands in desert or forested acres into primarily recreation or retirement developments have been quite common over the last 10 to 15 years. The amount of actual development and residence has been relatively minor. Future developments of this nature are a possibility.

At this writing, one such development in the planning stage is known of in the Dry Creek area immediately west of Goose Lake, southwest of Lakeview, Oregon.

Malin to Medford

Land uses in this area have also remained relatively stable; and are expected to remain so with a few possible exceptions.

Also, as discussed in the Midpoint to Malin portion, recreation and retirement subdivisions of forest and range areas have occurred in this area and could increase in the future. Limitations are the relative shortage of prime areas in private ownership, and increased zoning control by local government. No future developments of significant magnitude are known at this time.

Residential use is increasing in the "foothill" country east of the Medford and Ashland areas. Undoubtedly there could be conversion of

range, forest, and agricultural land to residential use. The amount would probably be relatively insignificant compared to the total area of land presently devoted to such uses.

Esthetics

Midpoint to Malin

The area crossed by the proposed route is characterized by vast open space areas with small, widely separated communities and sparse development. The vast majority of the lands are in public ownership and devoted to extensive, as opposed to intensive, uses. Due to the ownership pattern and inherent land use limitations, the open space-esthetic charactetistics of the overall area are not expected to be significantly altered or modified in the foreseeable future.

Potential geothermal development could significantly alter local esthetic values. The extent of the esthetic value alteration, which is dependent upon the extent and magnitude of development is not quantifiable at this time. Other possible future alterations of existing local esthetic values includes additional livestock range development and agriculture development, particularly circular sprinkler irrigation along the Idaho portion of the proposed route.

Malin to Medford

The area crossed by the proposed route includes the developed agricultured area of the Klamath Basin, including scattered farm communities and residences, and the timberlands of the Southern Cascades, including several scattered settlements and rural residences. The majority of the lands in the Klamath Basin are in private ownership while the Southern Cascades area is divided between both private and public ownership. The existing open space-esthetic characteristics of the overall route area can be expected to be reduced in the future through rural residential and related urbanization of private lands. Other possible future alterations of the existing esthetic environment include geothermal and increased agricultural development of the Klamath Basin together with intensified forest management on both public and private lands.

Recreation Resources

Midpoint to Malin

Recreation resources and uses along the proposed route, which are closely related to esthetic values, are not expected to be significantly altered in the foreseeable future. Possible future geothermal development could alter the esthetic setting and the corresponding impact on recreation users would be dependent upon the extent and degree of development and it not quantifiable at this time.

Recreation use in the route area could increase, commensurate with the population growth and the trend toward more leisure time.

The generally universal desire among urban dwellers to escape into less crowded, natural areas adds to the probability of increased recreation activities.

Malin to Medford

Recreation resources and uses along the proposed route, which are closely related to esthetic values, can be expected to be locally altered in the foreseeable future. Increased rural residential, geothermal and agricultural development could alter the esthetic setting for waterfowl and small game hunting in the Klamath Basin. Increased rural residential development and intensified forest management in the Southern Cascades could alter the esthetic setting for sightseeing, deer hunting and related recreation activities.

Recreation use in the route area could increase, commensurate with the population growth and the trend toward more leisure time. The generally universal desire among urban dwellers to escape into less crowded, natural areas adds to the probability of increased recreation activities.

Socioeconomic Conditions

Most of the 12 counties which would be crossed by the proposed Midpoint-Malin-Medford powerline would not receive any of the electric power carried by the 500 KV powerline. Jackson, Klamath, and Lake Counties are the exception. The availability of electric power is discussed in the following "Market Area" section of this chapter. This assessment of the future environment without the proposed project does not include a consideration of electric power and does not include Jackson County, Oregon.

The economic and social trends evident in the seven Idaho counties and four Oregon counties would be expected to continue even if the proposed powerline would not be constructed. The growth of urbanized areas, for instance the Boise, Nampa, Caldwell area, would probably continue. Idaho is currently one of the fastest growing states and was ranked third in 1975. Most of the growth is occurring along the Snake River plain - especially in the Boise area. The "Idaho Tomorrow" program has shown Idahoans want a growing economy with a majority desiring continued growth at the current rate. In 1970, the population of Idaho was 713,000. The State Water Plan (Idaho Department of Water Resources, March 1976) estimated Idaho's January 1, 1976 population at 830,000 and projections show 1,200,000 for the state by the year 2000 - an annual increase of 1.8%. The OBERS "Series C" projections (Department of Commerce, 1972) show a population of 847,000 in Idaho by the year 2000 - an annual increase of only about 0.63%. Although there is no general agreement among demographers, a continued rate of growth in excess of 1% annually would probably occur in the Boise-Nampa-Caldwell area. Rural areas in the seven Idaho counties will probably grow at very modest rates.

The four Oregon counties; Malheur, Harney, Lake, and Klamath have shown growth rates significantly below the average for the State of Oregon. Oregon grew in population at a rate of about 1.85% from 1950 to 1970. The OBERS "Series C" projections indicate continued annual population growth of about 1.6% to 1980 and 1.45% to the year 2000.

The general trend toward fewer and larger farms and ranches in southwestern Idaho and southeastern Oregon will probably continue. There will probably be additional new irrigated agriculture south of the Snake River in Idaho. The structure and relative importance of industries for these 11 counties is not expected to change significantly, except for Ada County, Idaho. The predominately rural counties dependence on agriculture, food processing, timber and other natural resources should maintain the present economic structure. Ada County will probably continue to exhibit a growing, diversified economy.

MARKET AREA

Present Situation

Pacific Power and Light Company generates, purchases, transmits, and distributes power in a six-state area that includes Wyoming, Montana, Idaho, Washington, Oregon and California. Pacific's major divisions or service areas include Mid-Oregon, Columbia, Southwestern, Washington-Montana-Idaho and Wyoming. According to company records, Pacific served 547,307 individual electric customers as of December 31, 1975. Of this total, 472,809 are residential customers in the six state area - about 86%. The 74,498 commercial customers represent about 13% and industrial customers less than 1% of all electric power customers served by Pacific.

In 1970, Pacific reported general business sales of 12,221,568,000 kilowatt hours and total sales of 13,320,982,000 kilowatt hours. Residential sales represented 38%, commercial 23%, and industrial 39% of energy sold in general business. In 1975, general business sales totaled 15,110,830,000 kilowatt hours with all sales totaling 18,248,788,000. Residential sales represented 40% commercial 25%, and industrial 35% of energy sold in general business. In 1970, residential users averaged 11,539 kilowatt hours annually and averaged 12,856 kilowatt hours in 1975. 1/

At the present time, electric power from the Wyoming generating facilities is transmitted to southeastern Idaho via transmission lines from the Jim Bridger coal-fired generating plant. Electric power is transmitted over several existing lines through Idaho along the Snake River and into Pacific's system in Washington and Oregon. The communities receiving electric power and the type of power use in the Columbia, Mid-Oregon, and Southwestern divisions are shown in Table II-49. The market area most pertinent to this environmental impact statement is the Southwestern Division.

Market areas for electric power do not conform to county, state, hydrologic, or other commonly used boundaries. The Grants Pass, Medford, and Klamath Falls areas represent about two-thirds of the customers in Pacific's Southwestern Division. The electric power which would be carried over the proposed 500 KV transmission line would be primarily marketed in the Southwestern Division with some power marketed in the Pacific Northwest and California. It appears that most of the electric power would be marketed in the Southwestern Division - especially the Medford - Grants Pass area. The balance of power would be transmitted from the Malin substation over existing lines either north to the Pacific Northwest, or south to California depending on the time of year. Therefore, Jackson and Josephone Counties in Oregon should be representative of the market area for purposes of analysis.

Jackson County

Jackson County increased over 66% in population between 1940 and 1950, 26% from 1950 to 1960, and about 28% between 1960 and 1970. The 1974 population was estimated at 110,300 persons. Since the 1970 Census showing 94,533 persons, the population has increased an average of about 4% annually. During the period 1950 to 1970, the population increased an average of about 2.7% annually, (Greater Medford Chamber of Commerce, August 1975). Population of incorporated cities for selected years is shown in TABLE II-50.

1/ Pacific Power and Light Company; Annual Report 1974, March 15, 1975

TABLE II-49

NUMBER OF ELECTRIC CUSTOMERS BY DISTRICTS & SUB OFFICES[1/]
September, 1976

	NUMBER AT SEPTEMBER 30, 1976					INCREASE OVER LAST YEAR				
	Total Customers	Residential	Commercial	Industrial	Other	Total Customers	Residential	Commercial	Industrial	Other
MID-OREGON DIVISION										
Astoria	9 155	7 844	1 252	43	16	165	151	26	-	(12)
Seaside	6 622	5 822	778	5	17	100	122	(16)	-	(6)
Total Clatsop	15 777	13 666	2 030	48	33	265	273	10	-	(18)
Lincoln City	6 213	5 552	641	9	11	110	120	(6)	-	(4)
Albany	17 554	15 027	2 466	50	11	665	628	39	(1)	(1)
Lebanon	7 119	6 199	899	17	4	249	189	62	(2)	-
Stayton	7 178	5 955	1 185	26	12	223	238	(12)	-	(3)
Sweet Home	4 765	4 203	543	17	2	119	126	(5)	(1)	(1)
Total Albany	36 616	31 384	5 093	110	29	1 256	1 181	84	(4)	(5)
Corvallis	16 915	14 812	2 054	36	13	136	73	69	(1)	(5)
Dallas	5 126	4 503	603	15	5	223	215	13	(1)	(4)
Independence	2 315	1 905	398	10	2	92	85	8	(1)	-
Total Corvallis	24 356	21 220	3 055	61	20	451	373	90	(3)	(9)
Junction City	10 218	8 389	1 774	47	8	328	302	26	1	(1)
Cottage Grove	9 316	8 047	1 236	26	7	321	319	1	2	(1)
Springfield	-	-	-	-	-	-	-	-	-	-
Bend	11 475	9 762	1 684	27	2	560	518	43	(1)	-
Prineville	4 743	3 872	851	17	3	151	119	30	2	-
Redmond	4 002	3 237	750	13	2	185	124	59	4	(2)
Madras	3 864	2 891	957	9	7	123	106	17	-	-
Total Central Oregon	24 084	19 762	4 242	66	14	1 019	867	149	5	(2)
Portland	59 847	53 048	6 479	103	217	370	336	42	1	(9)
Hood River	4 683	3 713	940	15	15	79	58	23	-	(2)
The Dalles	-	-	-	-	-	(6 153)	(5 028)	(1 085)	(19)	(21)
TOTAL MID-OREGON DIVISION	191 110	164 781	25 490	485	354	(1 954)	(1 199)	(666)	(17)	(72)
SOUTHWESTERN DIVISION										
Coos Bay	14 803	12 850	1 884	61	8	269	281	(11)	2	(3)
Coquille	5 622	4 642	951	26	3	124	118	6	-	-
Total Coos Bay	20 425	17 492	2 835	87	11	393	399	(5)	2	(3)
Grants Pass	25 086	21 759	3 265	54	8	1 134	1 024	120	(5)	(5)
Medford	40 051	35 209	4 701	113	28	1 320	1 289	31	6	(6)
Roseburg	19 999	17 283	2 632	63	21	701	664	41	2	(6)
Myrtle Creek	5 788	4 879	878	19	12	191	179	11	-	1
Total Roseburg	25 787	22 162	3 510	82	33	892	843	52	2	(5)
Klamath	22 356	18 762	3 534	30	30	261	454	(182)	(2)	(9)
Tulelake	2 801	1 824	963	10	4	(35)	(14)	(21)	-	-
Total Klamath Falls	25 157	20 586	4 497	40	34	226	440	(203)	(2)	(9)
Lakeview	2 525	2 010	494	20	1	64	67	(1)	(2)	-
Alturas	1 940	1 488	438	10	4	26	26	(1)	-	1
Total Lakeview	4 465	3 498	932	30	5	90	93	(2)	(2)	1
Crescent City	7 006	5 865	1 116	21	4	231	227	5	(1)	-
Yreka	9 349	7 308	2 001	32	8	341	281	64	(4)	-
Mt. Shasta	6 690	5 602	1 066	10	12	115	90	25	-	-
Total Yreka	16 039	12 910	3 067	42	20	456	371	89	(4)	-
TOTAL SOUTHWESTERN DIVISION	164 016	139 481	23 923	469	143	4 742	4 686	87	(4)	(27)

1/ Data provided by PP&L

TABLE II-50

POPULATION ESTIMATES OF INCORPORATED CITIES, SELECTED YEARS,

JACKSON COUNTY, 1960-1972

City and County	1960	1966	1971	1972
Ashland	9,119	12,200	13,000	13,980
Butte Falls	384	389	396	400
Central Point	2,289	3,800	4,180	4,390
Eagle Point	752	1,040	1,350	1,535
Gold Hill	608	600	625	670
Jacksonville	1,172	1,364	1,780	1,915
Medford	24,425	29,300	30,150	31,000
Phoenix	769	1,140	1,370	1,425
Rogue River	520	660	840	845
Talent	868			
Jackson County	73,962	95,000	97,620	100,100

OBERS "Series C" projections show an expected 1.6% per year population increase for Oregon between 1970 and 1980 and about 1.4% from 1980 to the year 2000 (Department of Commerce, 1972). Population projections for Bureau of Economic Analysis Area #158 (an eight county area) indicate growth of about 1% annually would be expected. Projections for the Oregon Coastal subarea as used by the Water Resources Council (a five county area) also projected growth of about 1% annually. The OBERS projections appear to be too conservative concerning Jackson County. A continued growth rate of about 2.5% annually, based on similar increases since 1950, seems more likely.

The economy of Jackson County is based largely on forest products, agriculture, and recreation and tourism. Forest products are the major source of income, with both timber harvest and wood products manufacturing contributing toward both income and employment. Pear production, livestock production and dairying are the major agricultural enterprises. Tourism ranks third in importance to the economy and has grown steadily the past decade. Employment by industry in 1970 is illustrated in TABLE II-51.

Josephine County

The population of Josephine County has sharply increased since 1920 (Table II-52). Between 1940 and 1950, population increased 63% and increased 35% between 1950 and 1970. The population estimate of 38,500 in 1972 represents a 3.85% increase since the 1970 Census. Considering the OBERS projections in the foregoing pages and the relatively long history of continued population growth in Josephine County, a continued increase of about 2% annually is expected.

TABLE II-51

EMPLOYMENT BY INDUSTRY IN 1970

Civilian Labor Force - Total	37,130
Workers in Labor Management Disputes	0
Unemployment	2,350
Percent of Labor Force	63
Employment - Total	34,780
Agricultural	3,020
Self-employed, Unpaid Family and Domestic Workers	5,000
Wage and Salary Workers	26,700
Manufacturing - Total	6,380
Food Products	420
Lumber & Wood Products	5,060
Printing	210
Stone-Glass, etc.	140
Fabricated Metals & Mach.	220
All Other Manufacturing	330
Non-Manufacturing - Total	20,380
Contract Construction	1,020
Trans.-Comm.-Pub. Util.	1,690
Trade	6,250
Finance Insur. Real Estate	1,380
Service & Misc.	3,920
Government	6,120
Federal	1,060
State & Local Education	3,460
Local & State Gov. Admin.	1,600

TABLE II-52

POPULATION GROWTH, JOSEPHINE COUNTY

Year	Population	Percent Increase Period	Percent Increase Percent
1910	9,567	---	---
1920	7,655	1910-1920	-19.9
1930	11,498	1920-1930	50.2
1940	16,301	1930-1940	41.7
1950	26,542	1940-1950	62.8
1960	29,917	1950-1960	12.7
1970	35,746	1960-1970	19.5
1972	38,500	1970-1972	7.7

The economy of Josephine County is based largely on the forest resources. About 85% of the county is forested and 70% of the land area is in public ownership. About 700,000 acres of forested land are managed by the Forest Service and the Bureau of Land Management, 7,000 acres are state-owned, about 31,000 county-owned, with about 159,000 acres of commercial forests in private ownership. Harvesting timber and manufacture of wood products makes very substantial contributions to the local economy in both employment and income. In 1970 there were 29 logging contractors, 15 sawmills or planning mills, 8 plywood and veneer plants, and 4 other wood products plants. These industries employed about 2,000 workers. In addition to the standard forest products, wood chips are being produced and shipped throughout the state.

Outdoor recreation makes an important contribution to the economy and is the second leading industry. The Rogue River and its tributaries are becoming increasingly popular for a wide range of recreation pursuits - fishing, boating, swimming, hunting, hiking, camping, and others. For instance, 29 county parks were used by 543,376 people in 1972 which represented an increase of over 20% above 1971 levels of use. National magazine and television coverage of the Rogue River have generated private recreational enterprises. The recreation and tourist expenditures fall into the trades and services industrial sectors. The following data gives an indication of the importance of tourist-related business:

NUMBER AND SALES OF TOURIST-ORIENTED BUSINESSES
GRANTS PASS AND JOSEPHINE COUNTY, 1967 1/

	Josephine County		Grants Pass	
Business	Number	Sales	Number	Sales
Gasoline service stations	59	$5,808,000	53	$4,253,000
Eating & drinking places	82	3,524,000	50	2,367,000
Hotels, motels, tourist camps	57	N/A	33	N/A

Agriculture is limited to about 4% of the land area in the county - about 39,000 acres. Most of the farmland is located in three lowland areas: Grants Pass, Applegate Valley, and the Illinois Valley. About 6% of the farmland is irrigated grazing or pasture with little land use for other agricultural purposes.

Employment in Josephine County by major economic sector is shown in Table II-53.

TABLE II-53
INDUSTRY EMPLOYMENT, JOSEPHINE COUNTY

	Number	Percent
Unemployment		9.7
All Industry Employment	10,849	100.
Agriculture and Fisheries	598	6.
Mining	20	-
Construction	695	6.
All Manufacturing	2,693	25.
Furniture and Lumber	1,776	-
Food and kindred mfg.	93	-
Transportation, communication	431	4.
Utilities	118	1.
Wholesale Trade	310	3.
Retail Trade	2,103	19.
Services	1,972	18.
Finance Ins., Real Estate	433	4.
Public Education	620	6.
Public Administration	536	5.

1/ Resource Atlas, Josephine County; Extension Community Development Project, Oregon State University; July, 1973.

Future Situation

The market area has shown steady increases in population for over 30 years and the outlook is for continued population growth. Similarly, the use of electric power has increased dramatically and the outlook is for a continued increasing demand for electric power as well as increased per capita use of power.

Historically, Jackson County, Oregon has shown an increase in population of about 2.5% annually and Josephine County about 2% annually. The OBERS population projections for BEA Area #158, an eight county area including those two counties, show much lower growth projections. Historical and OBERS projections for the two counties are shown in TABLE II-54.

TABLE II-54

FUTURE POPULATION GROWTH

JACKSON AND JOSEPHINE COUNTY, OREGON

	1970	1980			1990		
		a/	b/	c/	a/	b/	c/
Jackson	94,533	118,166	103,230	102,285	147,707	112,211	105,660
Josephine	35,746	42,895	39,035	38,677	51,474	42,431	39,953
Totals	130,279	161,061	142,265	140,962	199,181	154,642	145,613

	2000		
	a/	b/	c/
Jackson	184,634	121,300	106,463
Josephine	61,769	45,868	40,257
Totals	246,403	167,168	146,720

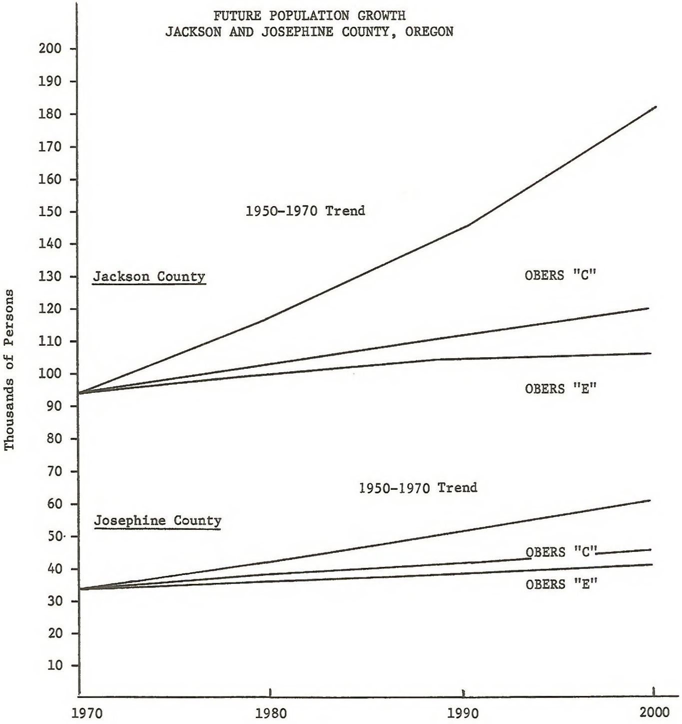
a/ Continuation of past trends based on historical data 1950-1970
b/ Rate of growth BEA #158; Series "C" OBERS
c/ Rate of growth BEA #158; Series "E" OBERS

It appears most likely that the market area, considering other counties with lower rates of growth, should continue to gain population at a rate of between 1.8% and 2% annually.

Continued growth in population will probably result in increasing demands for electric power. Projecting power demand, or forecasting, is an art rather than a science. Econometric modeling procedures are being initiated in some northwestern states, but are not yet functional. The current

This information is illustrated in Figure II-51

FIGURE II-51



methodology used by most of the northwestern utilities involves a consideration of historical information and projections into the future based on that information. Among the factors commonly employed in forecasting are population trends, per capita power use trends, energy conservation trends, power prices, availability of various kinds of energy, residential building trends, regional economic trends, and others. As a rule, energy forecasting is a continuous process and projections are being revised by the major utilities on a continuing basis.

The West Group of the Pacific Northwest Power Pool forecasts are published annually by the Pacific Northwest Utilities Conference Committee. The West Group includes the major utilities in Oregon, Washington, Northern Idaho and Montana. The West Group forecast for 1975 to 1985 is for a continued 4.9% annual load growth. The average compound energy growth for the period 1965 to 1975 was 5.37% or compared to a national average rate of 6.2%. Pacific Power and Light has forecast the need for electric power at an average rate of about 5.9% annually through 1983. A deficit of power is expected to occur in 1978, if power generated in Wyoming is not brought into the system (TABLE II-55).

Records of Pacific (Annual Report, 1974) indicate sales of power throughout their system increased an average of about 5.76% between 1970 and 1974. The number of customers increased an average of about 4% annually during this period, and power use per customer increased an average of about 1.5% annually. The number of customers increased a little over 3% in the Southwestern Division.

The number of new customers in the Southwestern Division is largely a result of increased population but also reflects new business starts and trends toward electric heat. Where in past years about half the newly constructed homes were heated with electricity, up to 90% now have electric heat. The Jackson County building inspector estimates about 75% of new residences in 1973 heated with electricity, but about 90% of new starts in 1975 were heated with electricity. In Grants Pass, the building inspector similarly estimated new starts and remodeling were about 90% electric heat. However, this trend does not apply to commercial and industrial buildings. The great majority of commercial and industrial buildings in Josephine County are heated with natural gas.

Considering a variety of factors, future power needs for Pacific's Southwestern Division can be estimated. This estimate is based on historical data and the following assumptions:

- population will increase at about 2% annually through 1985, and will then increase at a decreasing rate.

- The number of new customers will increase at a higher rate than population - about 3% annually through 1985, decreasing to 2.5% through 1995 and 2% to 2000.

TABLE II-55

PACIFIC POWER & LIGHT COMPANY

Load and Resource Estimates

Units: Megawatts

Line No.							
1.	Operating Year	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
2.	Peak Load estimate	3991	4255	4498	4755	5028	5316
3.	Peak Resource Estimate	4162	4580	4889	4792	5166	5224
4.	Peak Margin, Surplus (Deficiency)	171	325	391	37	138	(92)
5.	Peak Resource Transfers Wyoming to west	1114	1343	1613	1545	1484	1423
6.	Peak Margin w/o Wyoming Transfers (Line 4-5) (Deficiency)	(943)	(1018)	(1222)	(1508)	(1346)	(1515)
7.	Average Energy Load Estimate	2300	2455	2599	2753	2915	3089
8.	Average Energy Resource Estimate	2355	2367	2493	2678	2767	2834
9.	Average Energy Margin, Surplus (Deficiency)	55	(88)	(106)	(75)	(148)	(255)
10.	Resource Transfers Wyoming to west	712	829	937	983	1011	927
11.	Average Energy Margin w/o Wyoming Transfers (Line 9-10) (Deficiency)	(657)	(917)	(1043)	(1058)	(1159)	(1182)

Source: PP&L, Power Resources Department 11/17/75

- Average KWH per customer averages 12,300 and is estimated to increase at a rate of about 1.545% annually to 1985, decreasing to 1% annually 1990, 0.8% after 1995.

- The accuracy of estimates vary proportionately with the time interval; the farther into the future, the larger the variance or error.

Power use in the Southwestern Division is projected as shown in TABLE II-56.

TABLE II-56

PROJECTED POWER USE

SOUTHWESTERN DIVISION

	1975	1980	1985	1990	1995	2000
Customers	133,293	153,287	176,280	198,315	223,104	245,414
KWH/annum	12,300	13,250	14,274	14,988	15,737	16,366
KWH	1,639,503,900	2,031,052,700	2,516,220,700	2,972,345,200	3,510,987,600	4,016,445,500
Average Increased Power Use per annum		4.8%	4.8%	3.6%	3.6%	2.9%

The average increased power use of 4.8% annually through 1985 estimated above appears consistent with the West Group Forecast of a 4.9% load growth in the Pacific Northwest.

Records of power use in the Southwestern Division for the years 1969 - 1974 have reflected annual increases of from 6.06% to 1.22% average energy. Peak demand during those years reflected annual increases of 7.69% to 4.5%. Peak demand expressed in Megawatts increased an average of about 5.45% and average energy demand increased an average of about 4.7% annually during that period. This information is listed in Table II-57. If past trends continue at this historic rate of increase, power use would increase as projected in Table II-57.

Based on the historical information and assuming that these past trends continue, average energy use in the Southwestern Division would approximate 685 to 700 MW by 1985. Peak demand would probably exceed 1500 MW by 1985. Since about 300 MW are produced in the division and Bonneville Power Administration personnel have stated present transmission facilities are at a very near capacity, it appears that about 400 MW of power would have to be brought to the Southwestern Division by 1985.

TABLE II-57

Energy Use in Southwestern Division

	Year	Peak Demand MW	% Annual Increase	Average Energy MW	% Annual Increase	Energy Deficit MW
1/	1969	660		330		
	1970	690	4.545%	350	6.06%	
	1971	715	3.623	370	5.71	
	1972	770	7.69	390	5.405	
	1973	805	4.545	410	5.128	
	1974	860	6.83	415	1.22	
2/	1975	907	5.45	435	4.705	20
	1976	956	"	455	"	40
	1977	1008	"	476	"	61
	1978	1063	"	498	"	83
	1979	1121	"	521	"	106
	1980	1182	"	546	"	131
	1981	1246	"	572	"	157
	1982	1314	"	599	"	184
	1983	1386	"	627	"	212
	1984	1462	"	657	"	242
	1985	1542	"	688	"	273

1/ Pacific Power and Light; Unpublished Records, 1963-1974
2/ Projected or Estimated Use, 1975-1985.

The market area without the proposed project, or some other source of electric power, would be expected to develop an energy deficit before 1980. This could result in curtailment of future industrial expansion together with a possible reduction in the current level of industrial activity. An energy deficit would result in reduced output of goods, reduced employment, unreliable power for residential heating, cooling, refrigeration of foods. A power deficit would be expected to develop incrementally. "Brownouts" and periodic power outages would probably increase in frequency and duration. The general impact of a progressive electric energy deficit would be expected to slow economic growth and development, and contribute toward a general deterioration of the quality of life in the market area. The magnitude of economic decline and the decrease in the quality of life would be in proportion to the duration and magnitude of an energy deficit.

CHAPTER III

ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

This chapter considers the environmental impacts of the proposed project that could happen in the absence of mitigation. Mitigating measures and residual impacts are set out in Chapters IV and V.

CLIMATE

Midpoint to Medford

Construction of the proposed transmission line should not have any affect on the climate throughout the project area; no impacts on climate are expected to result.

AIR QUALITY

Midpoint to Medford

Air quality throughout the proposed project area is good, except for intermitted periods in the Medford airshed. Construction activities, as set forth in Chapter I, would contribute small amounts of air pollutants. Primary pollutants would be fugitive dust raised by moving equipment and vehicles and exhaust from construction equipment and motor vehicles. Such pollutants would be concentrated in the immediate vicinity of construction activities and at intermittent intervals. The longevity of the impact is an interaction of so many ambient variables at a particular point on the ground that a complete quantitative analysis is impossible.

Should right-of-way debris in forested areas be burned rather than lopped and scattered in the ground, smoke pollution would result. This also would be concentrated and only occur at one given time.

Pollution emitted to the atmosphere, besides having a minor impact on air quality, could have an esthetic impact because of dust and smoke visibility. However, the pollutants would be quickly dispersed and the impact short-lived.

GEOLOGY-TOPOGRAPHY

Midpoint to Medford

The proposed project would not affect the geology or topography along the proposed right-of-way. Impacts resulting from superficial disturbances such as road construction are discussed in the soils section.

MINERAL RESOURCES

Midpoint to Medford

The proposed action would not require any mineral resources to be removed along the proposed right-of-way. No mineral resources are known to exist within the proposed right-of-way, therefore, no direct impact on this resource would result.

An off-site, national, impact to the mineral resources would be the estimated 33,810 tons of steel that would be required for towers, conductors and shield wires.

Another off-site minerals impact would be the amount of sand and gravel used for cast-in-place concrete tower footings. The amount cannot be estimated at this time as specific tower foundation requirements are to be determined in the final engineering design.

The proposed substations and reactor station have not been designed at the time of this writing so no data is available as to the amount of steel, concrete, etc. that would be required.

SOILS

Midpoint to Malin to Medford

Soils impacts would result from construction of proposed construction and access roads and preparation of tower sites, assembly areas, pulling and stringing pads. Soil compaction would occur whenever equipment was transported overland. Erosion would be accelerated whenever the soil surface is compacted, disturbed, or vegetation removed.

The following discussion describes the soil erosion potential of proposed construction activities. It was calculated by using the soils information in TABLE II-3 and the following Universal Soil Loss Equation (U.S.D.A., Soil Conservation Service, 1972).

$$A = R\ K\ L\ S\ C\ P$$

Where: A = computed soil loss in tons per acre per year

R = total kinetic energy of a storm through its maximum 30-minute intensity. The product is called erosivity index and is calculated in foot-tons per acre inch of rainfall.

K = interrelated soil properties which influence erosion: texture, percent organic matter, soil structure and permeability

$$L = \left(\frac{\text{slope length in feet}}{72.6}\right)^{0.6}$$

$$S = \frac{0.43 + 0.30\ s + 0.043\ s^2}{6.613} \quad \text{where } s = \text{slope}$$

C = cropping practices vegetative cover

P = erosion control practices

Assumptions and rationale:

1. That the dominant soil in the association is the only taxonomic unit which occurs along any portion of the proposed right-of-way as identified by the individual symbols on Soil Maps A1 and B1 in the Appendix of the Draft Statement. Rationale for this assumption is that since site specific information is not available, the chosen taxonomic unit represents all the soils in the association and its inclusions.

2. That the slope is constant throughout the entire map delineation traversed by the proposed action. Rationale is that site specific information is not available, and if it were, the data would be too voluminous for the purpose of this statement.

3. That the slope length is 100 feet. This is an arbitrary figure that becomes a constant so differences among sites depends upon characteristics other than slope length.

4. That the soil surface is bare and there are no erosion control practices.

5. The K value depends mostly upon permeability for changes. Constants within the K factor are percent silt + very fine sand = 65 percent, sand (0.10 2.0 mm) = 5 percent, organic matter = 3 percent and that the soil structure was fine granular. Site specific information is lacking to properly assign values to the K component of the equation. Therefore, most constituents were held as a constant. Permeability was taken from TABLES II-3 and 4.

6. The potential soil loss for various line segments is an average of the individual taxonomic units and the assumptions 1 through 5 above. This was necessary in order to condense the data to fit the concept of addressing individual line segments.

7. That the sediment load, as measured in major rivers within the area, portrays half the amount of present erosion lost from the sites of interest. Figures given under the column Ranges in Present Soil Loss (T/Ac/Yr) were derived in the following manner:

> Sediment yield from a nearby river in AcFt/MI^2/Yr (from water section) was converted to AcFt/Ac/Yr and multiplied by 2. The factor 2 was used to compensate for that portion of the sediment which is deposited before reaching a stream. Fifty percent deposition was an arbitrary figure. These values and calculations were used because there were no data available which quantified present erosion from areas that would be affected by the proposed right-of-way and transmission facilities.

Table III-1 contains the potential soil loss in tons per acre per year for each soil map symbol along Pacific's proposed Midpoint to Malin 500 KV transmission line right-of-way.

TABLES III-3a and III-4a show the net potential soil loss for a bare soil surface by segment due to all construction activities. TABLES III-3b and III-4b show the annual loss due to operation and maintenance. Loss of soil would reduce vegetative growth and increase sediment load in the water. Attempts to correlate the amount of vegetative growth to soil characteristics in arid and semiarid climates have not been satisfactory (Rice, 1972). Therefore, reduction of vegetative growth from erosion per se cannot be quantified. The major impact on vegetation would be its removal for construction. This impact is discussed in the subsequent Vegetation section.

Not all soil detached on-site would be transported to a perennial stream to become sediment. Part of it would be deposited as slope gradient and water velocities decrease and as the roughness coefficient

TABLE III-1

POTENTIAL SOIL LOSS - MIDPOINT TO MALIN

Soil Map Symbol	R Value	K Value	LS Value	Potential Soil Loss (Tons/acre/year)
		Midpoint to Hagerman Segment		
13	10	.27	.4	1.1
		Hagerman to Owyhee Junction Segment		
13	10	.27	.4	1.1
12	10	.27	.4	1.1
28	10	.30	.4	1.2
8	10	.30	1.1	3.3
17	10	.30	.4	1.2
20	10	.31	.6	1.8
21	10	.31	.6	1.8
Average Loss				1.5
		Owyhee Junction to Catlow Junction Segment		
21	15	.31	.6	2.8
3	15	.27	.2	0.8
10	15	.34	.4	2.4
4	15	.31	.4	1.8
Average Loss				1.9
		Catlow Junction to Malin Segment		
10	15	.34	.4	2.0
8	15	.27	.4	1.6
3	20	.27	.4	2.1
7	20	.30	.4	2.4
16	20	.27	.6	3.2
2c	20	.34	.4	2.7
3a	20	.33	.6	4.0
Average Loss				2.5

TABLE III-2 contains the potential soil loss in tons per acre per year for each soil map symbol along Pacific's proposed Malin to Medford 500 KV transmission line right-of-way.

TABLE III-2

POTENTIAL SOIL LOSS - MALIN TO MEDFORD

Soil Map Symbol	R Value	K Value	LS Value	Potential Soil Loss (Tons/Acre/Year)
		Malin - Stukel		
3a	20	.33	.4	2.6
3c	20	.27	.2	1.1
Average Loss				1.8
		Stukel - Green Springs		
3c	20	.27	.2	1.1
3b	10	.27	.2	.5
1c	25	.42	3.5	36.7
Average Loss				12.7
		Green Springs - Lookout		
4d	61	.37	10.0	225.7
		Lookout - Medford		
1c	30	.42	3.5	44.1
4d	30	.37	7.5	83.2
Average Loss				63.6

increase. Their interacting relationships are related by Manning's Equation which can be found in any basic hydrology textbook. For the purpose of this discussion, the basic assumption is that 50 percent of the potentially eroded soil would reach a stream or river. Impacts of the soil in the streams are discussed in the following Water Resource section.

TABLES III-5 and 6 show the potential accumulated soil loss due to the vegetation being removed. It was assumed that it would take an average of six years for the vegetation to reach the same ground cover percentage that existed before disturbance. The "C" factor in the erosion equation depends upon the percent of ground cover. The percent of ground cover vegetation assumed to recover per year and the corresponding "C" value are as follows:

Years After Disturbance	Percent Ground Cover Recovery	Percent Ground Cover	"C" Value
0	0	0	1
1	10	7	0.36
2	30	28	0.20
3	20	42	0.15
4	20	56	0.10
5	10	63	0.09
6	10	70	0.021

The average ground cover before disturbance was about seventy percent. Therefore, there will be only about seventy percent ground cover if native vegetation fills in at its own pace. The figures were arrived at by taking the net potential soil loss from TABLE III-3a and multiplying it by the appropriate "C" value for each successive year.

TABLE III-7 is a summary of the potential soil loss over the entire life of the project. The loss due to operation and maintenance assumes that a ten-foot wide strip remains bare for the life of the project.

Compaction occurs whenever the soil is subjected to forces which reduce the pore space. The amount of compaction depends upon the amount of energy applied (weight), soil moisture content, individual soil characteristics and organic matter content. Reduction of pore space reduces infiltration rates and root penetration which result in a higher erosion potential and less vegetative growth.

It is impossible to quantify the effects of compaction upon vegetation and erosion as the interacting factors listed above result in varying degrees of compaction. Compaction can range from no appreciable damage to destruction of the soil structure. As a general rule, multiple

TABLE III-3a

NET POTENTIAL SOIL LOSS DUE TO CONSTRUCTION BY RIGHT-OF-WAY SEGMENT

MIDPOINT TO MALIN

Route Segment	Range in Present Soil Loss T/Ac/Yr	Avg. Poten. Soil Loss (T/Ac/Yr)	Acres 1/ Disturbed	Total Existing Loss (T/Yr)	Total Pot. Loss (T/Yr)	Net Potential Soil Loss (T/Yr)
Midpoint to Hagerman	0.12 - 0.62	1.1	65	24	71.5	47.5
Hagerman to Owyhee Jct.	0.62 - 1.25	1.5	293	274	439.5	165.5
Owyhee Jct. to Catlow Jct.	0.12 - 1.25	1.9	181	126.7	343.9	217.2
Catlow Jct. to Malin	<0.62	2.5	317	196.5	792.5	595.9
Total			856	621.2	1,647.4	1,026.1

1/ This includes tower footings,pulling sites, roads, and substations and the reacter station, where applicable.

TABLE III-3b

NET POTENTIAL SOIL LOSS DUE TO OPERATION AND MAINTENANCE BY RIGHT-OF-WAY SEGMENT

MIDPOINT TO MALIN

Route Segment	Range in Present Soil Loss (T/Ac/Yr)	Avg. Poten. Soil Loss (T/Ac/Yr)	Acres	Existing Soil Loss (T/Yr)	Potential Soil Loss (T/Yr)	Net Potential Soil Loss (T/Yr)
Midpoint to Hagerman	0.12 - 0.62	1.1	22	8.1	24.2	16.1
Hagerman to Owyhee Jct.	0.62 - 1.25	1.5	140	130.9	210.0	79.1
Owyhee Jct. to Catlow Jct.	0.12 - 1.25	1.9	104	71.2	197.6	126.4
Catlow Jct. to Malin	<0.62	2.5	173	107.3	432.5	325.2
Total			439	317.5	864.3	546.8

TABLE III-4a

NET POTENTIAL SOIL LOSS DUE TO CONSTRUCTION BY RIGHT-OF-WAY SEGMENT

MALIN TO MEDFORD

Route Segment	Range in Present Soil Loss (T/Ac/Yr)	Avg. Poten. Soil Loss (T/Ac/Yr)	Acres Disturbed 1/	Total Existing Soil Loss (T/Yr)	Total Pot. Loss (T/Yr)	Net Potential Soil Loss (T/Yr)
Malin to Stukel	<0.62	1.8	40	24.8	72.0	47.2
Stukel to Green Springs	<0.62	12.7	108	67.0	1371.6	1304.6
Green Springs to Lookout	0.12 - 0.62	225.7	10	3.7	2257.0	2253.3
Lookout to Medford	0.12 - 0.62	63.6	50	18.5	3180.0	3161.5
Total			208	114.0	6880.6	6766.6

1/ This includes tower footings, pulling sites, roads and substations and reacter stations, where applicable.

TABLE III-4b

NET POTENTIAL SOIL LOSS DUE TO OPERATION AND MAINTENANCE BY RIGHT-OF-WAY SEGMENT

MALIN TO MEDFORD

Route Segment	Range in Present Soil Loss (T/Ac/Yr)	Avg. Poten. Soil Loss (T/Ac/Yr)	Acres	Existing Soil Loss (T/Yr)	Potential Soil Loss (T/Yr)	Net Potential Soil Loss (T/Yr)
Malin to Stukel	<0.62	1.8	18	11.2	32.4	21.2
Stukel to Green Springs	<0.62	12.7	21	13.0	266.7	253.7
Green Springs to Lookout	0.12 - 0.62	225.7	5	1.9	1,128.5	1,126.6
Lookout to Medford	0.12 - 0.62	63.6	32	11.8	2,035.2	2,023.4
Total			76	37.9	3,462.8	3,424.9

TABLE III-5

ACCUMULATED POTENTIAL SOIL LOSS FOR THE PERIOD REQUIRED FOR VEGETATION TO RETURN TO THE BASE LEVEL GROUND COVER CONDITION

PROPOSED ROUTE MIDPOINT TO MALIN

Route Segment	Net Potential Soil Loss 0 Year (T/Yr)	Potential Soil Loss for						Total Potential Soil Loss for 6 years (Tons)
		1st year (T/Yr)	2nd year (T/Yr)	3rd year (T/Yr)	4th year (T/Yr)	5th year (T/Yr)	6th year (T/Yr)	
Midpoint to Hagerman	47.5	17.1	9.5	7.1	4.7	4.3	1.0	91.2
Hagerman to Owyhee Jct.	165.5	59.6	33.1	24.8	16.6	14.9	3.3	317.8
Owyhee Jct. to Catlow Jct.	217.2	78.2	43.4	32.6	21.7	19.6	4.3	417.0
Catlow Jct. to Malin	595.9	214.5	119.2	89.4	59.6	53.6	11.9	1,144.1
Total								1,970.1

TABLE III-6

ACCUMULATED POTENTIAL SOIL LOSS FOR THE PERIOD REQUIRED FOR VEGETATION TO RETURN TO THE BASE LEVEL GROUND COVER CONDITION

PROPOSED ROUTE MALIN TO MEDFORD

Route Segment	Net Potential Soil Loss 0 Year (T/Yr)	Potential Soil Loss 1st year (T/Yr)	2nd year (T/Yr)	3rd year (T/Yr)	4th year (T/Yr)	5th year (T/Yr)	6th year (T/Yr)	Total Potential Soil Loss for 6 years (Tons)
Malin to Stukel	47.2	17.0	9.4	7.1	4.7	4.3	0.9	90.6
Stukel to Green Springs	1,304.6	469.7	260.9	195.7	130.5	117.4	26.1	2,504.9
Green Springs to Lookout	2,253.3	811.2	450.7	338.0	225.3	202.8	45.1	4,326.5
Lookout to Medford	3,161.5	1,138.1	632.3	473.2	316.2	284.5	63.2	6,069.0
Total								12,991.0

TABLE III-7

SUMMARY FOR POTENTIAL SOIL LOSS OVER THE PROPOSAL ROUTE FOR THE LIFE OF THE PROJECT

MIDPOINT TO MALIN

Line Segment	Potential Soil Loss due to Constructions for 6 Years after Disturbance (Tons)	Potential Soil Loss for 50 years due to Operation and Maintenance (Tons)	Total (Tons)
Midpoint to Hagerman	91.2	805.0	896.2
Hagerman to Owyhee Jct.	317.8	3,955.0	4,272.8
Owyhee Jct. to Catlow Jct.	417.0	6,320.0	6,737.0
Catlow Jct. to Malin	1,144.1	16,260.0	17,404.1
MALIN TO MEDFORD			
Malin to Stukel	90.6	1,060.0	1,150.6
Stakel to Green Springs	2,504.9	12,685.0	15,189.9
Green Springs to Lookout	4,326.5	56,330.0	60,656.5
Lookout to Medford	6,069.0	101,170.0	107,239.0
Total			213,546.1

passes of heavy equipment result in compaction. The wetter the soil, the less passes it requires to achieve the same degree of compaction.

Soil productivity would be lost permanently where the proposed reactor and substations would be constructed. Five acres would be lost at Fields, Oregon; 9 acres at Malin, Oregon; 10 acres at Midpoint, Idaho; and 12 acres at the proposed Medford-area substation. There would be some loss in productivity where the proposed tower legs would emerge from the ground. The actual acreage is unknown.

Roads in mountainous terrain can initiate a landslide under certain circumstances. The degree of hazard for mass movement cannot be identified with known information. Landslides have adverse effects upon water quality and vegetal productivity. The amount of adverse effects is not known.

Some soil would also be lost from stream banks at stream crossings. This soil would degrade water quality. The amount of soil that would be lost and the amount of sediment from any one crossing or from all the crossings is unknown.

WATER RESOURCES

Midpoint to Medford

Impacts upon surface waters would be the result of the potential increase in erosion described in the preceding Soils discussion. With the assumption that 50 percent of the eroded material reaches a stream or river, the total potential soil loss for each right-of-way segment was divided by two and converted to acre-feet of potential sediment for the proposal action over the 50-year life span of the project. TABLES III-8 and III-9 show these data.

It must be remembered when one compares the 3rd column against the last column that this is not the amount of increased sediment that the stream would carry. It is the potential amount of increased sediment that would come from only those acres impacted. The acres impacted are a very minute percentage of the acres included in the total watershed(s) that would be crossed by any one segment of the proposed right-of-way.

The following example is presented to show the relative magnitude of sedimentation which has the potential to be added to the Owyhee River during construction and rehabilitation of the proposed power line.

The proposed power line would traverse about 85 miles within the Owyhee River drainage basin. Approximately 146 acres would be disturbed along this 85 miles which would contribute about 0.06184 acre-feet of sediment during a six-year construction and rehabilitation period.

The Owyhee River drainage basin upstream from the proposed power line route drains approximately 4,200 square miles which yields about 0.06 acre-feet per square mile per year and about 3,600 square miles which yields about 0.15 acre-feet of sediment per square mile per year. This is a total of 792 acre-feet per year or 4,752 acre-feet of sediment in a six-year period.

The percent of the sediment load which would be caused by power line construction and rehabilitation is calculated thusly:

$$\frac{0.06184}{4,752} \times 100 = 0.0013 \text{ percent}$$

Construction of the proposed transmission facilities would result in some additional sediment production at stream crossings. The amount would depend upon site specifics and how the crossings would be accomplished. Sediment would adversely affect fisheries habitat and water quality.

The proposed construction could cause some damage to springs and seeps if heavy equipment would operate in them or if they should become contaminated as discussed later.

The possibility exists that a landslide could be triggered in mountainous terrain which could adversely affect water quality and

TABLE III-8

EXISTING SEDIMENT YIELD/CALCULATED INCREASE

MIDPOINT TO MALIN

Route Segment	Range in Existing Sediment Yield (Ac-Ft/Mi^2/Yr)	Range in Existing Sediment Yield (Ac-Ft)(10^{-5})/Ac/Yr	Net Potential Sediment Yield for 6 Years due to Construction (Ac-Ft) 1/	Net Potential Sediment Yield for 50 Years due to Operation and Maintenance (Ac-Ft)	Total Potential Sediment Yield over 50 Years (Ac-Ft)
Midpoint to Hagerman	0.02 - 0.1	3.1 - 15.6	0.02280	0.20125	0.22405
Hagerman to Owyhee Junction	0.1 - 0.2	15.6 - 31.2	0.07945	0.98875	1.06820
Owyhee Junction to Catlow Junction	0.02 - 0.2	3.1 - 31.2	0.10425	1.58000	1.68425
Catlow Junction to Malin	<0.1	<15.6	0.28603	4.06500	4.35103
Total					7.32753

1/ Net potential yield was derived by dividing the net amount of erosion shown in TABLE III-5 by 2 and converting it from tons to acre feet.

The conversion figure used was 2000 tons per acre foot.

TABLE III -9

EXISTING SEDIMENT YIELD/CALCULATED INCREASE

MALIN TO MEDFORD

Route Segment	Range in Existing Sediment Yield (Ac-Ft/Mi^2/Yr)	Range in Existing Sediment Yield (Ac-Ft)(10^{-5})/Ac/Yr	Net Potential Sediment Yield for 6 Years due to Construction (Ac-Ft) 1/	Net Potential Sediment Yield for 50 Years due to Operation and Maintenance (Ac-Ft)	Total Potential Sediment Yield over 50 Years (Ac-Ft)
Malin to Stukel	<0.1	<15.6	0.02265	0.26500	0.28765
Stukel to Green Springs	<0.1	<15.6	0.62623	3.17125	3.79748
Green Springs to Lookout	0.02 - 0.1	3.1 - 15.6	1.08163	14.08250	15.16413
Lookout to Medford	0.02 - 0.1	3.1 - 15.6	1.51725	25.29250	26.80975
Total					46.05901

1/ Net Potential yield was derived by dividing the net amount of erosion given in TABLE III-6 accumulative by 2 and converting it from tons to acre-feet.

The conversion figure used was 2000 tons per acre foot.

fisheries habitat. The degree of hazard is unknown as is the sediment production into streams if a landslide was triggered.

Other potential water impacts could include chemical and/or microbiological contamination. Chemical contamination could result from indiscriminant or accidental discharge of oil, gas or concrete into surface waters. This would have detrimental effects upon aquatic life and water quality.

Most waters leaving the area that would be crossed by the proposed right-of-way eventually enter lakes or reservoirs. The impact upon the storage capacities of these facilities by sedimentation due to the proposed construction activities is not known. It can be presumed to be undetectable.

Water consumption could cause water rights conflicts. This impact could cause loss in cattle or crop production downstream. There would be some water used for dust control and construction activities. The amount of water that would be required is unknown.

Pacific's proposed right-of-way and transmission facilities would not impact ground water resources.

NOISE

Midpoint to Medford

Heavy equipment such as bulldozers, cranes, backhoes, trucks and possibly aircraft would generate short-term localized increases in noise levels during the proposed project construction period. Construction equipment would be continually changing location along the proposed right-of-way, being in one specific location no more than about one week at a time, so a lasting noise source would not exist at any one location. Exceptions would be at the proposed substation and reactor sites. Construction noise at these sites would be of longer duration but would still represent only a short-term increase in noise levels.

The impact of construction noise would be limited as construction activities would not be carried out close to population centers. The nearest settlement, Fields, Oregon, with a population of 5 is approximately one mile from the proposed route. The Mitre Corporation's RALI Report, July, 1975 states that where construction activity might be carried out within 500 feet of houses or other buildings, the noise impact of protracted operations could reach an unacceptable level, but that it reaches an acceptable level at a distance of 1,000 feet or more. There are a few residences within 500 feet of the proposed transmission line. However, between Midpoint and Hagerman there are fewer than ten residences in the proximity of 1,000 feet from the proposed line and also less than ten on in to the Medford area. Average construction noise levels at a distance of 1,000 feet are estimated to be about 50 decibels, which is considered to be an acceptable level.

The proposed transmission line would generate an audible hissing, snapping sound associated with corona. Corona can be defined as an electrical discharge that occurs when voltage applied to a conductor is greater than the dielectric strength of the surrounding insulation, resulting in the breakdown of the air immediately adjacent to the conductor. It is partially caused by small protrusions or irregularities such as dust, bugs, water droplets, or burrs and nicks on the conductors. It is also influenced by precipitation, with foul weather having the major effect. Audible noise projection is greatest during heavy rainstorms, but background noise from the rain mashes the effects of electrical noise. Therefore, fog is considered the condition that causes the worst noise emission (RALI, 1975).

When the audible noise levels are highest, it is estimated that the noise level at the edge of the proposed right-of-way would average about 50 decibels, the sound to the human ear of a diesel engine at a distance of about 1,000 feet.

Noise associated with corona would be only heard by people who might happen to be near or under the proposed transmission line, so the impact is not important. However, it could have an impact on wildlife, which is discussed in the wildlife section.

The Oregon Department of Environmental Quality, by letter of November 4, 1975 to the Oregon Public Utility Commission, states: "The operation of the 500 KV transmission line along the selected route, and of the associated substations, will produce noise levels which are well within the standards established in State of Oregon Noise Control Regulations, OAR, Chapter 340, Section 35-035. These noise levels should not have any significant impact on people. Analysis included both broad-band and narrow-band noise from the transmission line itself and from its substations. The noise levels associated with the operation of the line are fairly low, and the line and its substations are relatively isolated from noise sensitive properties."

The Midpoint substation and the proposed Fields reactor station are more than one mile from the nearest residence. The site of the proposed Medford substation is about 1,760 feet from the nearest building. According to the Oregon Department of Environmental Quality, the most likely configuration of transformers would produce a noise level of about 47 decibels at that distance.

VEGETATION

Midpoint to Malin

Construction of the proposed electric transmission facilities would entail a variety of actions which would result in clearing of vegetative cover along the proposed right-of-way. These would include clearing for roads, tower sites, tower footings, stringing and tensioning pads, the proposed reactor station, and enlargement of the substations at Midpoint and Malin. (see Chapter I)

The estimated amount of vegetative cover that would be removed during the construction phase is shown in TABLE III-10. This would represent a temporary impact on the vegetative resource. The period of time required for vegetation by natural processes would vary widely between sites, depending on precipitation, growing season, soil type, and past and future use of the area. However, recovery should occur in three to eight years except on extremely dry, unproductive sites. Unproductive sites are essentially barren at present (prior to disturbance) and constitute a relatively small portion of the total; hence the amount of vegetative removal on such sites would be negligible.

An average of six years for vegetation by natural means would be generally applicable to the proposed route, based on soil and climate factors (to reach the vegetative density existing prior to any disturbance).

The loss of vegetative cover would also have impacts on soils, wildlife habitat, water quality and esthetics.

Following power line construction, the vegetative cover would be permanently lost on a portion of the area disturbed during construction. This would include the area devoted to structures and facilities needed for operation and maintenance of the proposed transmission line facilities.

Pacific's proposal indicates that no permanent maintenance roads would be installed. However, to estimate maximum possible unmitigated impacts it is assumed in this discussion that a permanent, ten-foot-wide bare maintenance road would run the length of the line - except across agricultural lands, aquatic type vegetation and where the line would be adjacent to existing power lines.

The acreage of vegetative cover that would be permanently lost is shown in TABLE III-11. Losses are due to roads, a reactor station, and expansion of existing substations. The amount of vegetative cover permanently lost on tower sites is negligible (less than 10 square feet per tower).

TABLE III-10

ACRES OF VEGETATION REMOVED DURING CONSTRUCTION

MIDPOINT TO MALIN

	Vegetative Type-Acres						
Route Segment	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Aquatic	Total
Midpoint to Hagerman	39	10		16			65
Hagerman to Owyhee	218	37		38			293
Owyhee to Catlow	171	10					181
Catlow to Malin	135	37	98	12	32	3	317
Total	563	94	98	66	32	3	856

Cause	Acres
Roads	796
Tower Sites	25
Tower Footings	8
Stringing Pads	3
Reactor Station	5
Midpoint Substation Expansion	10
Malin Substation Expansion	9
Total	856

TABLE III-11

ACRES OF VEGETATION PERMANENTLY LOST

	Vegetative Type						
Route Segment	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Aquatic	Total
Midpoint to Hagerman	19	3		-			22
Hagerman to Owyhee	120	20		-			140
Owyhee to Catlow	98	6					104
Catlow to Malin	77	19	58	-	19	-	173
Total	314	48	58	-	19	-	439

Note: (-) signifies less than 1/2 acre loss.

Cause	Acres
Roads	415
Reactor Station	5
Substation expansion	19
Total	439

In addition to the 19 acres of forest type completely removed, an additional 310 acres of commercial forest type would be altered to noncommercial forest by removal of tall growing commercial species.

When considering the vegetative resource per se, the loss of vegetation cover is the ultimate impact. Secondary impacts upon production of economic goods (wood products and grazing forage, for example) are discussed in the subsequent Land Use discussion.

The permanent loss of vegetative cover would also have impacts upon other resources, such as wildlife habitat, soil erosion, water quality and esthetics.

Pacific's proposed right-of-way and transmission facilities would also have the following impacts on the vegetative resource.

Increased Fire Hazard: The increased activity and vehicular access would increase the chance of man-caused fires in desert shrub, juniper, grass and forest vegetative types. This impact cannot be quantified. Conversely, improved vehicle access could be an aid to fire suppression efforts.

Herbicide Use: Maintenance activities could involve the use of herbicides to eliminate undesirable vegetation. This always entails the risk of accidental damage to "non-target" vegetation. This impact is an uncertain factor and cannot be quantified. It could also affect wildlife and water quality.

Toxic Emissions: Extra high voltage lines can produce above-normal amounts of ozone and nitrous oxide which can have adverse effects on vegetative vigor and growth (Hill, 1961). However, no data could be found that documented 500 KV lines produce these compounds in amounts sufficient to produce such damage (Sherer, 1973).

Threatened and Endangered Plants: Chapter II contains a list of threatened and endangered plants that <u>may</u> occur on the proposed route based on range and habitat preferences. Quantitative impacts in terms of number of plants, species, etc. cannot be predicted. Data is not available on population densities and distribution of these plants and exact on-the-ground proposed location of roads and tower sites. It is also possible that none of these plants are found within the area that would be impacted.

Possible Increase in Density: Natural revegetation of temporarily disturbed areas could result in greater density of ground cover than existed prior to disturbances, due to opening "seed beds" for grass seed. Disturbance - without denuding - could be beneficial to plant growth and vigor ("cultivation" effect).

In some cases, fire could result in a change in composition of vegetative species by destroying shrub and/or juniper overstory and stimulating the growth of native grasses and forbs.

Malin to Medford

Construction of the proposed transmission line would entail a variety of actions which would result in removal of vegetative cover (Chapter I). They would include clearing for road construction, tower sites, footings, stringing pads, and a substation in the Medford vicinity.

The estimated vegetative cover that would be removed during construction is shown in TABLE III-12.

The foregoing losses or alteration of vegetative cover would also have impacts upon soil, water quality, wildlife and esthetics.

Construction impacts represent a temporary impact on the vegetative resource. If revegetation is by natural processes, the period of time required for revegetation will vary between sites, depending on climate, soil type, and past and future use of the areas. Recovery time is estimated at three to eight years. An average time of six years would be generally applicable to the entire route based on soil and climate factors.

Areas needed for structures and facilities required for operation and maintenance of the proposed line would lose their vegetative cover for the life of the project-50 years (considered permanent losses in this discussion). These include roads and the Medford substation.

For purposes of assessing maximum possible unmitigated impacts it is assumed in this discussion that a permanent maintenance road 10-feet in width will serve the entire line, except for agricultural lands and where the line is in the near vicinity of existing transmission lines.

The acreage of vegetative cover that would be permanently lost is shown in TABLE III-13.

In addition to the 26 acres of vegetative cover that would be permanently lost in the forest type, another 971 acres would be altered by elimination of commercial coniferous species. Commercial timber production would be lost, and a non-commerical type would result.

This removal or alteration of the vegetative resource would affect soils, water quality, wildlife and esthetics. These impacts are discussed in the respective sections on these resources.

Impacts on vegetation affecting the production of economic goods (wood products and grazing forage, for example) are discussed in the following Land Use section.

Other impacts on the vegetative resource would be the same as those discussed in the preceding Midpoint to Malin discussion. (Increased fire hazard, herbicide use, toxic emissions, threatened and endangered plants, and possible increase in vegetation density).

TABLE III-12

ACRES OF VEGETATION REMOVED DURING CONSTRUCTION

MALIN TO MEDFORD

	Vegetative Type						
Route Segment	Desert Shrub	Grass	Juniper	Agri-culture	Conif. Forest	Broad Sclero.	Total
Malin to Stukel	22	2	16				40
Stukel to Green Springs	3	4	8	19	74		108
Green Springs to Lookout		8			2		10
Lookout to Medford		15			25	10	50
Total	25	29	24	19	101	10	208

Cause	Acres
Roads	187
Tower Sites	6
Tower footings	2
Stringing pads	1
Medford substation	12
Total	208

TABLE III-13

ACRES OF VEGETATION PERMANENTLY LOST

MALIN TO MEDFORD

	Vegetative Type						
Route Segment	Desert Shrub	Grass	Juniper	Agri-culture	Conif. Forest	Broad Scher.	Total
Malin to Stukel	12	1	5				18
Stukel to Green Springs	2	2	5		12		21
Green Springs to Lookout		4			1		5
Lookout to Medford		13			13	6	32
Total	14	20	10		26	6	76

Roads = 64 acres, Medford Substation = 12 acres

WILDLIFE

Construction, operation and maintenance of Pacific's proposed Midpoint to Medford right-of-way and 500 KV transmission facilities would have the following general impacts on wildlife:

Loss of wildlife through destruction or alteration of habitat.

Loss of wildlife through the opening up of thousands of acres formerly inaccessible to vehicular travel.

Loss of bird life through collision with lines and towers; disturbance of other wildlife through corona effect.

Loss of fish and other aquatic life through siltation caused by construction and loss of some riparian vegetation important to both aquatic and terrestrial wildlife.

The most significant losses would occur in areas of high waterfowl concentration. (U.S.F.W.S., 1976) On the other hand, some benefits could accrue to wildlife due to changes in vegetation which would benefit ground dwelling wildlife, and the use of towers as perches and nesting sites for raptorial birds (Nelson, per comm. 1974).

Roads: While there are some existing roads along the proposed route, a maximum of 579 miles of temporary access road could be constructed (Chapter I). The access road would be relatively short-lived as it would be seeded and water barred after project construction would be completed. However, even after rehabilitation they would be accessible to four-wheel drive vehicles. From past experience, hunters would utilize them whenever possible. For example, a work trail installed along Bonneville Power Administration's 750 DC line across Drake's Flat near Warner Valley has become a hunting access road.

Assuming that an area one mile each side of the proposed power line road would be hunted, the additional hunting pressure and/or harassment could affect various types of wildlife on about 689,280 acres. (538.5 miles of road (579 miles minus 40.5 miles on agricultural lands) x 2 miles wide = 1077 square miles x 640 acres per square mile = 689,280 acres)). Of this total, wildlife using an estimated 190,000 acres of crucial deer winter range, 91,000 acres of antelope range and 22,800 acres of wild horse range would be adversely impacted by people and/or vehicles passing through their ranges.

Many small antelope and deer herds and sage grouse flocks in Oregon and Idaho along the proposed right-of-way survive only because of very light hunting pressure and lack of harassment by vehicles and human activity. Additional access would greatly increase hunting, poaching and harassment to the point of reducing and scattering these populations. The deer wintering areas are already roaded to some extent, but the

proposed right-of-way would offer an inducement to travel through those areas in four-wheel drive and other ORV's including snow vehicles in the critical winter months.

Wilderness species such as bear, cougar, wolverine, fisher and Rocky Mountain elk tend to avoid areas of vehicular activity - especially when accompanied by hunting. Wild horse herds are also displaced by new vehicular activity in their home ranges. Small game and non-game wildlife suffer from "plinkers" and other casual hunting along roads. It has also been found that eagles using power line towers as hunting perches, and/or nesting are often the victims of "road hunters." This unlawful hunting is often accompanied by damage to insulators and conductors. While this vandalism occurs mainly on smaller feeder lines, it has occurred on high voltage lines. It is assumed that these impacts could occur along the proposed 500 KV line. The ease of access to raptor concentrations could also lead to the loss of young birds and eggs to falconers.

Idaho and Oregon Wildlife Department personnel fear that in many cases vehicular access into formerly inaccessible areas could place an intolerable hunting pressure on scattered wildlife populations. Many birds, animals, reptiles and amphibians would not be able to readily move to other adjacent habitat areas since they are already occupied by other species to the limit of their carrying capacity.

Habitat Loss: Construction of access roads for power line construction would alter or destroy about 983 acres of habitat (2 acres lost per mile of access road). Other habitat not actually changed or destroyed could be made untenable for wildlife use because of human harassment and overhunting. Removal of vegetation in big game wintering areas could have an adverse impact on these animals. Removal of escape cover in big game hunting areas and migration routes promotes the "shooting gallery" effect.

In some areas, the change of vegetation caused by construction activities could be beneficial to wildlife. In Oregon, elk and deer are known to utilize 500 KV rights-of-way for feeding (Mace, personal communication) (Harper, 1971). In Idaho, some power lines are believed to be beneficial to wildlife since the rights-of-way provide additional forage (Lee, 1974) (Goodwin, 1975). The creation of an edge effect, by changing vegetative types, height and density, could benefit big game and other wildlife species that respond to such diversity.

Some small rodents, mammals, and ground nesting birds could be destroyed during construction activities by crushing, burrow compaction or destruction of a microsite where no other habitat is available.

Construction noise and other human activity could cause temporary loss of wildlife along the proposed right-of-way. For example, disturbance of any kind could cause nesting eagles or hawks to desert their nests

and eggs, leaving young to die. This is especially true for the ferruginous hawk. Breeding sage grouse could be forced to leave their strutting grounds, resulting in a loss of birds through reproductive interference. Any effects would be of short-term duration.

Big game could be forced to vacate hiding, fawning or calving grounds, resulting in a loss of young through predation, malnutrition or starvation. Most big game species are extremely intolerant of any human intrusion near areas used for rearing their young. If they are forced to move out of the area, losses to the young animals could result since their basic protection is the ability to remain hidden and inconspicuous. Fawning areas are usually in a specific site. If the animals are forced to move, they would have to compete with others of their kind for another site already in maximum use. Quantification of these losses is difficult to assess.

Based on his studies of the Snake River in Washington, (Oliver, 1967) shows that the survival and abundance of many desirable upland birds is greatly dependent on riparian habitat. Based on a direct quadrate census showing 23 pheasants per square mile, within 1/2 mile from the Snake River, he found that 58 percent of spring populations, 97 percent midsummer, 68 percent fall and 88 percent of wintering birds were dependent on streambottom vegetative food and cover.

The temporary loss of three acres of riparian vegetation would have a short-term effect on pheasants and other upland game birds using such habitat. In any one location this could cause a temporary reduction in local bird populations.

Springs and seeps highly important for wildlife water supplies could be destroyed or made unavailable by compacting or other construction activities.

Collision and Corona: The design of the proposed power line is such that it could result in bird losses of considerable importance over the life of the project from collision with the transmission facilities. The towers, conductors and shield or ground wires would impose serious barriers to birds during migrating, feeding and nuptial flights and would kill or cripple birds colliding with them.

Nocturnal avian migrants and local feeding and nesting populations are especially prone to collide with manmade objects. Magnitude of losses would depend on tower height, visibility, bird density and flight patterns. Most birds migrate at a height that normally clears most manmade obstacles, but when blinded or confused, losses could occur. This subject is controversial and needs further study. (Arend, 1970), in a report for the Pacific Gas & Electric Company, states that "Electric power transmission lines mounted on steel towers cause a very minor avian loss and that the adverse ecological impact on avian populations is negligible." The Fish and Wildlife Service, however, does not accept

this as a blanket conclusion and has indicated that major losses of migratory birds would likely occur in areas of intensive use and low level flights, such as in the Klamath Basin and Warner Valley. A literature review shows that much of the data concerning collisions is based on migrating passerine birds striking TV antennas and tall lighting structures at airports. Most of these towers are above the height of PP&L's proposed 500 KV lines and towers. It is known, however, that during periods of storm and poor visibility, resident and migrating birds decrease elevation, become confused, and tend to strike lower structures. Also, waterfowl feeding flights are usually much lower to the ground, making the probability of collisions with power lines much greater than for migrating birds. (Noster, 1976, U.S.F.W.S., 1976)

The following are examples of bird losses from collisions:

An estimated 50,000 birds lost through collision with a ceilometer at Warner Robins Air Force Base in Georgia. These birds were all passerines (Johnston and Haines, 1957).

Thirty thousand birds killed by a TV tower and guy wires at Eau Claire, Wisconsin: 15,000 killed in one night, nearly all passerines. This was a 1,000 foot tower (Kemper, 1964).

Twenty-one mute swans killed by impact and electrocution by an overhead power line above a reservoir in England. This was 30 percent of the total flock (Harrison, 1963).

One hundred night migrants killed at Oakridge, Tennessee. An airport ceilometer contributed to most of the passerine losses (Johnston and Haines, 1957).

Twenty-three Franklin Gulls and 20 blue winged teal killed by power lines. Dabbling ducks, with mallards predominating, appear to be most vulnerable to wire collisions (Krapu, 1973). Seven hundred and sixty passerines killed at the Omega Navigation Tower, La Mouse, North Dakota (U.S.D.I., 1974) (13).

In April 1975, eight mallards were killed by striking a 115 KV distribution line west of Lakeview, Oregon. Fish & Wildlife Service personnel surmise the losses were due to an erratic "nuptial flight" since the collisions occurred during good daylight visibility (Personal correspondence with Howard Querin, U.S.F.S., May 1, 1975).

Scott, Roberts and Cadbury (1972) state that in England, powerlines of 400,275 and 132 KV "sited near estuaries, river valleys or between bodies of water provide a particular hazard when they lie across flight paths used by waterfowl, waders, gulls, or other water birds between feeding and roosting areas." Their study accounted for a known loss of

1285 migratory birds, with 6000 (including passerines and gulls, rails and ducks) estimated killed over a six-year interval at Dungeness, Kent.

About 140 waterfowl were killed through collisions with a transmission line across a 2,000 acre lake in Illinois from September 4 to December 20, 1974 (Anderson, Hurley and Leets, 1975).

The Fish and Wildlife Service states that "the greatest threat occurs when large numbers of birds concentrate in an area for resting, feeding, or nesting purposes. These birds stay for a period of time ranging from a few days to three or four months. Soon after arriving at such an area the birds develop a series of flight patterns that are not similar to migration flights. These movements are usually most pronounced between sunset and sunrise when lighting and visibility is poor. Another characteristic of these flights is the low elevation at which they occur, especially within or adjacent to the feeding and resting sites. It is during these local flights that collisions are most likely to occur rather than during migration flights which often cover hundreds of miles nonstop at high elevations. The problem is increased by inclement weather conditions such as local fog or snow storms which restrict visibility and often causes the birds to fly at low elevations."

While the anticipated loss of waterfowl and other migratory birds on the proposed line is speculative, the Fish and Wildlife Service feels strongly that major losses would probably occur (U.S.F.W.S., 1976).

In addition to bird collision losses, it is believed that the "corona effect" could have an undesirable effect on wildlife along Pacific's proposed right-of-way. (Refer to "Noise section").

Recent engineering changes in power line installations have reduced undesirable corona effects on humans, but little has been done to determine impacts on wildlife. While a noise level in the 40 to 50 decibel range is considered tolerable to humans, it has not been determined what the effects could be on animals that may be precariously existing at the edge of their habitat tolerance level. If the proposed power line would emit a considerable amount of noise, especially during foul weather, wildlife could be forced from the right-of-way. During crucial periods of the year this could deny the right-of-way to breeding and wintering animals and adversely affect to an unknown degree those animals living along the power line.

Since impacts are unknown, corona effects should be reduced as much as possible (U.S.F.W.S., 1976).

However, Goodwin (1974) found that elk and deer ignored noise levels of up to 68 decibels during migration.

Illegal shooting of Raptors: Eagles and raptors perch and nest on large transmission towers such as those proposed. Experience in other states indicates that losses are most likely to occur when power lines and roads are within 200 yards of each other. The Ellis, Smith and Murphy (1969) study in Utah showed a loss of 30 raptors along a 12-mile segment of power distribution line. Fourteen birds were golden eagles, and most carcasses showed bullet wounds.

Electrocution: It is not believed that there would be any losses of raptors or other birds through electrocution by the proposed power line. Conductors would be spaced so far apart that eagles and other birds should not be endangered.

Water Quality and Fish Habitat: Construction activities could have a detrimental effect on water quality and aquatic wildlife as a result of soil runoff from disturbed sites entering drainages and water sources. On major streams such as the Snake River, the estimated soil loss of 1.1 tons per acre per year may have little effect on fish life and water quality. In small streams, or lakes and ponds with little chance of dilution, such siltation pollution could mechanically destroy aquatic wildlife through smothering, kill plant life through loss of sunlight to submerged species, and cause decreased water quality through presence of suspended solids (U.S.D.I., 1972), (U.S.D.I., 1973). It is assumed these effects could happen to some water supplies found along the proposed transmission line, especially in mountainous areas where soil loss from bare or disturbed ground can be as high as 226 tons per acre per year (See Soils impacts).

Riparian vegetation associated with the streambanks is of great importance to fish species as a source of food, shade (temperature) and hiding cover, as well as preventing siltation. Loss of this valuable streamside cover could cause aquatic wildlife losses through starvation, diseases and lack of oxygen through increased stream temperatures, and vulnerability to predatory birds, animals and other fish. However, since only three acres of riparian vegetation would be temporarily disturbed, impacts would be minor and of short duration. Improper culvert installations could impede fish movement for migrants and resident populations. Pumping water from springs and potholes could destroy threatened, endangered or unique fish, if any should exist.

Impacts on wildlife from the proposed substation expansion and reactor station construction are difficult to assess. Construction of the reactor station at Fields could destroy approximately 5 acres of wildlife habitat. It is not known what species would be adversely impacted. As the reactor station would be located about one mile north of Fields and adjacent to a county road, it does not appear that any lasting impacts to wildlife would occur.

Midpoint to Malin

A total of 860 acres of vegetative cover would be temporarily lost because of construction activities. Permanent loss, after rehabilitative measures, would amount to 439 acres. Of this acreage 314 acres would consist of desert shrub, 48 acres of grass type, 58 acres of juniper type and 19 acres of coniferous forest type.

This permanent vegetative loss would be of consequence on the two antelope kidding areas along the proposed right-of-way. Vegetative loss would be of more consequence to some small birds, animals and reptiles, though probably not crucial to any one species. The temporary loss of 3 acres of aquatic or riparian habitat, where nesting waterfowl, shore birds and other wildlife depend on riparian vegetation could be important. It is possible that some fish habitat at stream crossings could receive silt pollution, resulting in the loss of fish and fish forage species.

In the coniferous forest vegetative type, 329 acres of evergreen trees would be cleared, of which 19 acres would be permanently denuded of all vegetation. The other 310 acres would be changed from forest to brushtype species. Big game, especially deer, would probably benefit by the changing of a timber overstory to that of available forage species such as ceanothus, mahogany, etc. Small mammals could also benefit, depending on the disposition of logging slash. In a Douglas fir study (U.S.D.I., 1974) (9) Gashwiler found that deer mice increased in cleared areas soon after slash was burned. Certain other small mammals, such as Townsend's chipmunks, Oregon vole and snowshoe hare also increased at varying periods of time after the burn. Shrews and weasels decreased.

Many birds, mammals and other wildlife species would benefit by the "edge effect" created by the change in vegetative species, height and composition. Conversely, over 50 species of cavity dwelling wildlife, requiring old growth timber as habitat, would not be able to use the areas where timber would be removed. Species such as the goshawk, the pileated woodpecker and other woodpeckers, the northern flying squirrel and marten would not be able to utilize any of the 310 acres converted to brushlands.

Herbicides, if used, could be used principally for brush control or possibly for brush and reforestation control in the coniferous forest area. Some danger to wildlife species could occur as a result of vegetative control spraying, depending on the types of toxicants used.

The following discussion describes by segment the potential wildlife impacts predictably resulting from construction, operation and maintenance of Pacific's proposed right-of-way and transmission facilities.

Midpoint to Hagerman Segment

Of this 26-mile-long segment, 7.5 miles, or 29 percent is agricultural lands and the rest grass and shrublands. Some additional upland game birds using this area would be harvested due to increased hunting access. Waterfowl use this general area extensively for feeding. Flights would move back and forth across the proposed right-of-way. Some losses would occur by collision with the transmission lines and towers in this area. Shore birds, and the other bird life associated with wetlands would also suffer losses through collisions.

Intensive waterfowl flights in the Hagerman area, especially during migrations down the Snake River, would be subjected to possible losses due to collisions with the power lines and towers. Birds would be most vulnerable during periods of low visibility and inclement weather. Migrating birds, including passerines as well as waterfowl, would be lost through collisions. For example, if 1/2 of 1 percent of over 2,000,000 waterfowl migrating through Idaho across the proposed route were lost, it would amount to 10,000 birds; however, it is not possible to quantify numbers or species.

Eagles nesting near Hagerman, and utilizing that general area for hunting could be temporarily driven away from their territory by noise and disturbance. Eventually, eagles and hawks may utilize the proposed towers for nesting and perching (Nelson, personal communication 1974).

There is a burrowing owl nesting concentration just northwest of Midpoint. They are also found scattered along the proposed route from Midpoint on west to the Owyhee Mountains. Construction and the presence of people and vehicles could cause a slight reduction in these birds and their habitat.

Approximately 100 antelope winter in the area west of Midpoint. If construction should be done during the wintering period, some harassment and disturbance to the antelope could result, causing them to temporarily vacate part of their winter range. Impacts would be of short duration as they would in all probability return to the area upon completion of construction.

Amphibians and reptiles are found in unknown numbers and distribution along the proposed right-of-way. Some could be lost through crushing, den and burrow destruction and increased vulnerability to predators because of loss of ground cover.

There is evidence that some endangered peregrine falcon use this area because of large waterfowl populations they can prey upon. If there are mating pairs near Hagerman, construction could temporarily frighten the adult birds away from their eggs or young and could result in the loss of young birds. Also, with more human activity in the area, the presence of the birds might lead to theft of eggs or young for

falconry purposes, causing the extinction of these birds adjacent to the power line. The same detrimental impacts would apply to the prairie falcons found along this segment.

The threatened (Idaho) western ground snake may be found in this area and individual losses could occur through construction activities.

Snowy plovers, also classed as threatened, may also be found in this area. Nesting losses may occur through construction activities in the spring.

The threatened (Idaho, Oregon) northern bald eagle is sometimes a migrant along the Snake River. It may be vulnerable to shooting when perched on the proposed towers.

The white sturgeon, considered threatened in Idaho, is not expected to be adversely impacted by installation of the proposed line where it would cross the Snake River.

Hagerman to Owyhee Junction Segment

On this 136-mile-long segment, 18 miles or 13 percent is agricultural lands and 87 percent is shrub and grasslands. From Hagerman to the Owyhee Mountain foothills, the wildlife habitat consists principally of scattered sagebrush and grasses. Agricultural lands are found mainly near the Bruneau River.

An increase in human use of the area could cause a slight loss of upland game through an increase in hunting pressure resulting from additional vehicle access along the proposed right-of-way.

Waterfowl concentrations are found at the Bruneau River crossing and adjacent C.J. Strike Reservoir, both during feeding activities and during migrations. The proposed right-of-way crossing at the Bruneau River would result in losses similar to those anticipated at Hagerman. Other migrating birds, including such passerines as mourning doves, are vulnerable where an unknown number of flights would cross the proposed right-of-way. Concentrations of many other birds are found along the Snake River parallel to the proposed right-of-way from Hagerman to the Bruneau River, a distance of nearly 60 miles, increasing the likelihood of power line collisions.

Raptors including eagles, hawks, prairie falcons and possibly the peregrine falcon, move along this area and winter south of the proposed right-of-way. They would be more susceptible to illegal hunting. An estimated additional 20 raptors per year may be shot along this segment due to access roads that would be constructed. This estimate is based on known eagle shooting losses on distribution lines in eastern Oregon, and a Utah study by Ellis, Smith, and Murphy (1969).

The leopard dace, a rare fish species in Idaho, and the white sturgeon are not believed to be threatened by the proposed line although all fish could sustain moderate losses by sedimentation into streams along the route. The warm water game fish, salmonoids, and non-game fish found in the Snake and Bruneau Rivers probably would not be adversely affected.

Impacts on threatened and endangered species would be the same as for the preceding segment.

The band of 37 wild horses near Saylor Creek Air Force Range could be displaced from their natural range during construction activities resulting in some losses in marginal habitat. It is not known whether they are sensitive to any corona effects that would emanate from the proposed 500 KV transmission line. Any increased public use in the area would undoubtedly restrict their range to some degree.

The Owyhee Mountains are habitat for 100 bighorn sheep. While their range would not be crossed by the proposed right-of-way, they would undoubtedly suffer to some extent by the additional numbers of people traveling proposed access roads, and be subjected to some illegal hunting. There is no data to quantify this impact. The proposed right-of-way would pass between areas used by two small bands of elk, numbering 30 animals. These animals are also vulnerable to increased human use of their ranges, and would probably be adversely affected by the increased public access afforded by the service roads associated with the (U.S.F.W.S., 1976) proposed transmission line.

It does not appear that the large interstate herd of over 1,000 deer wintering along the Three Forks of the Owyhee would be adversely impacted to any great degree by the proposed transmission line, except for the access roads allowing a higher hunter use of the area.

Owyhee Junction to Catlow Junction Segment

Impacts on wildlife along this segment would be generally the same as described in the preceding segments.

As the proposed route would approach Steens Mountains, it passes the habitat of the Alvord chub in the Alvord Lake area. Though the total habitat for this small fish is not known, construction activities could cause losses to both fish and habitat through siltation of the small hot springs, seeps and potholes where they are found.

Increased access to the remote high desert area between the Owyhee and the Steens Mountains could put undesirable human pressure on both game and non-game species. The 400 antelope wintering in concentrations along this segment of the proposed right-of-way could be unduly harassed by construction and other human activities during the crucial winter months. This might force them into marginal wintering areas, causing an unknown loss of animals.

Bighorn sheep found just to the north of where the proposed right-of-way would pass through Long Hollow probably would not be adversely impacted since there is already an all-weather road through Long Hollow separating the Steens and Pueblo Mountains.

The threatened (Oregon) kit fox and snowy plover are found in this general area. Both species are mobile and could move away from construction activities, except during denning or nesting periods. Harassment and loss of habitat could further reduce already low populations.

Catlow Junction to Malin Segment

Between Catlow Junction and Warner Valley, the proposed right-of-way would traverse almost 50 miles of mostly roadless, fragile high desert. Additional access to this area could place heavy hunting pressure on game species such as the sage grouse and 1,400 antelope found in this area.

The many small mammals, reptiles and amphibians on and immediately adjacent to the proposed right-of-way route would be vulnerable to shooting. Some might be killed by vehicles and harassment. Losses would occur to the immediate habitat as a result of new access. While eagles would probably nest in and use the proposed towers for perches, that benefit may be more than cancelled due to losses from illegal shooting.

A major wildlife concentration occurs at Warner Valley. It is one of the most vulnerable areas along the proposed Midpoint to Malin right-of-way. More than 10,000 waterfowl use the Warner Lakes as a breeding - feeding area. An unknown, but substantial number of additional migrants, including other ducks, geese, coots, shore birds, terns, cranes, pelicans, cormorants, passerine birds and raptors pass through this concentrated area. In addition the area is heavily used by waterfowl, pelicans and other migrants for feeding. Annual counts have shown nearly 200,000 birds in the area.

During bad weather conditions, collisions with the proposed nine individual transmission and two ground lines would result in losses. The corona effect on migrating birds could cause some disruption or change in migrating patterns. There is no way to quantify these possible losses, but over a 20 to 30 year period they could be substantial.

An important antelope fawning area exists where the proposed right-of-way would cross south of Hart Mountain (Map B-2 in the Appendix of the Draft Statement). Disturbance during the spring fawning season could result in the loss of some antelope. The proposed route would be adjacent to Hart Mountain National Wildlife Refuge, and could cause the harassment of wildlife using the south side of the refuge. The Warner sucker, considered threatened in Oregon, would be vulnerable to siltation caused by construction if the silt enters streams at the time eggs are laid in tributaries to the Warner Lakes.

Some harassment to parts of the Drakes Flat antelope herd, sage grouse population and the adjacent Deep Creek deer herd (5,000 animals) would result from another access road allowing further hunting pressure.

There are waterfowl concentrations in Goose Lake Valley and along the proposed right-of-way past Willow, Little Muddy, Lower Cottonwood and Girbles Reservoirs and Lost River to Malin. Some losses from collisions of birds with the proposed lines and towers would be anticipated.

Potential impacts of the proposed transmission line on the Interstate Deer Herd, Bryant Mountain and South Goodlow herds are difficult to assess. While the general area along the state line and proposed right-of-way is already partially roaded, the new access that would be afforded by the proposed construction and maintenance transmission line roads would permit additional hunting pressure, and allow more people over more of the deer winter range migration route than formerly. Additional people, plus the construction and maintenance activities, could hamper migrational movement and deny the use of part of the winter range. Loss of vegetative cover is of concern in migration routes, making the animals more vulnerable to hunting and other harassment.

During bad weather, noise and other corona effects could have some detrimental effect on deer migratory movements. The impacts are speculative, and need field surveillance for verification. On the other hand, deer may benefit from the use of the new mixed forage species that would be found along the proposed right-of-way as a result of soil disturbance and vegetative manipulation.

The harassment of big game animals on their winter range by vehicular traffic and people could place an added stress factor on animals at a time of year when they are already in a weakened condition. Also, Rocky Mountain elk are intolerant of vehicular use of roads in their winter range. One major elk concentration in Oregon was driven from its winter range by photographers using snow machines. Subsequent closures of the area to all vehicles was necessary to allow elk use of the crucial wintering area.

TABLES III-14 and 15 summarize the potential adverse impacts of Pacific's proposed transmission line project between Midpoint and Malin on wildlife and wild horse habitats.

Malin to Medford

Proposed construction of roads for transmission line installation and maintenance would alter or temporarily destroy about 187 acres of habitat; 76 acres would be permanently lost. Other habitat could be made untenable for wildlife due to human harassment and increased hunting.

On this proposed 92-mile-long route, about 110 miles of new or reconstructed road could be built, which would be used from time to time

TABLE III-14

ADVERSE IMPACTS ON WILDLIFE HABITAT

MIDPOINT TO MALIN

	Deer Winter Range Acres			Antelope Range Acres			Access, Remote Areas			Forest Wildlife (4)		Waterfowl (5) By No. Sites		Raptors (5) By No. S	
Segment	(1) Miles	(2) Direct	(3) Indirect	Miles	Direct	Indirect	Miles	Direct	Indirect	Miles	Acres Affected	Direct	Indirect	Direct	Ind.
Midpoint to Hagerman	0	0	0	18	36	23,000	0	0	0	0	0	1	0	1	0
Hagerman to Owyhee	23	46	29,400	26	52	33,300	20	420	25,600	0	0	1	1	1	1
Owyhee to Catlow	0	0	0	11	22	14,100	12	252	15,400	0	0	0	0	0	0
Catlow to Malin	55	110	70,400	16	32	20,500	9	189	11,500	15.5	325	1	3	1	0
Totals	78	156	99,800	71	142	90,900	41	861	52,500	15.5	325	3	4	3	1

(1) Estimated miles of powerline passing through crucial big game habitat.

(2) Based on 2 acres of vegetation temporarily removed per mile of powerline road construction. Does not include towers, reactor stations, and pulling stations.

(3) Based on the effect of cars and people on animals 1 mile on each side of road. (Lineal mileage x 2 x 640 acres per sq. mile)

(4) Loss of timber computed at 21 acres lost per mile of right-of-way, for species requiring mature timber, including cavity nesters requiring snags and other dead trees.

(5) "Direct" means that the route crosses through a crucial production or migration area. "Indirect" means route passes closely enough to above areas to adversely affect species.

TABLE III-15

UNMITIGATED IMPACTS ON WILD HORSE HABITAT

ON THE PROPOSED ROUTE, MIDPOINT TO MALIN

APPLICANT'S PROPOSAL

		Acres	
Segments	Miles (1)	Direct (2)	Indirect (3)
Midpoint to Hagerman	0	0	0
Hagerman to Owyhee	6	12	3,800
Owyhee to Catlow	0	0	0
Catlow to Malin	0	0	0
TOTALS	6	12	3,800

(1) Estimated miles of power line right-of-way passing through crucial wild horse habitat.

(2) Based in 2 acres of vegetation removed per mile of power line right-of-way.

(3) Based in effects of vehicles & people on animals for 1 mile on each side of the road or trail (lineal mileage x 2 x 640 acres per mile).

by hunters and other recreationists with 4-wheeled drive vehicles, pickups and other off-road vehicles. Typically, an area about one mile on each side of the road would be hunted. This would lead to additional hunting pressure and/or harassment of wildlife on about 129,280 acres (101 miles of road (110 miles minus 9 miles on agricultural land) x 2 miles wide = 202 square miles x 640 acres per square mile = 129,280 acres). This is if wildlife utilize all of the area that would be crossed by the proposed project and that agricultural lands would not be hunted to any great degree by the public.

Additional access into such sensitive areas as the Jenny Creek deer winter range might greatly increase poaching pressure and harassment to the point of population reduction. (See Catlow to Malin segment). While the winter range is roaded to some extent, an additional eastwest road would encourage all-season use by ORV's, including snowmobiles.

Construction of the proposed transmission line would permanently remove 26 acres of timberland and alter an additional 971 acres to low trees or brush. It is not believed that the removal of cover along this portion of the route would have an adverse effect on deer. In heavily timbered areas, right-of-way clearing may be beneficial to big game species by allowing a variety of forage species to become available.

Other species dependent on trees for nesting and denning might be adversely impacted due to loss of shelter and food supply. This could include spotted owls, goshawks, marten and other cavity-dwelling species. Approximately 997 acres of timberland would be cut or modified along 47 miles of timbered land.

Potential impacts on fish and other aquatic organisms would be generally as described in the preceding Midpoint to Malin section.

Collisions of waterfowl with the proposed power line, electrocution, the effects of corona, including noise, would be as described in the preceding section.

The following discussion describes by segment the potential wildlife impacts predictably resulting from construction, operation and maintenance of Pacific's proposed Malin to Medford 500 KV right-of-way and transmission facilities.

Malin to Stukel Segment

Leaving the Malin substation north and west, the proposed right-of-way would follow an existing 230 KV wood pole line and cross approximately 18 miles of Bryant Mountain deer winter range. (From Malin Substation to north of Merrill). Any new construction across this portion of the deer winter range could temporarily deny deer the use of at least 36 acres of habitat and would indirectly affect habitat up to 1 mile on each side of the route for a total of 23,000 acres, during the winter

and early spring when deer are most vulnerable to harassment and forced movement from territorial wintering sites. This could result in a loss of animals; it is not possible to estimate numbers. New access could also be detrimental to upland game by subjecting them to additional heavy hunting pressure.

Stukel to Green Springs Segment

The greatest potential hazard to wildlife would come from placement of the power line from the west edge of the Klamath Hills to the Worden area on Highway 97 - a distance of approximately 7 miles. This portion of the proposed right-of-way would cross the major portion of the migration route for nearly 5 million waterfowl and thousands of other migratory birds that move through the Klamath Basin. In addition, an unknown number of daily feeding flights of resident waterfowl would pass across the proposed right-of-way. There are no natural obstructions in this seven-mile area to screen the proposed transmission line or make waterfowl rise to higher flight elevations. While losses of waterfowl and other migrants is speculative, the references cited (Midpoint to Malin) indicate that losses will occur. They could also be very high (U.S.F.W.S., 1976)

There is no other area in the United States that has a higher concentration of birds (Kebbe, DF&W., Lenhart, FWS, 1975 personal communication). Since the area is also important to breeding birds, there would be losses of ducks during erratic nuptial flights. During periods of poor visibility, such as at night when many migrations and feeding flights take place, the birds would have a barrier of 11 conducting and ground wires to fly past along a 14-mile segment of the proposed right-of-way. Heavy fogs, storms and wind cause elevation variations in feeding flights in that area, increasing the possibility of collision.

Besides the ducks, geese and swans using this area, the average 15,000 gulls and terns, 4,000 grebes and 1,700 white pelicans counted annually by the Fish and Wildlife Service (U.S.D.I., 1969) (11) plus cranes, herons, shore birds and passerine species would have to cross this aerial barrier to their flights. Based on losses in other areas, losses of thousands of birds could be anticipated in the Klamath Basin.

As cited above losses of migrant birds is speculative, and opinions about the probable magnitude and significance of bird kills vary greatly. Power company representatives indicate that minor losses will occur. On the other hand, the Fish and Wildlife Service has indicated that major losses would probably occur. The latter opinion has also been expressed by a private party, Mr. T. Roster, of Klamath Falls, Oregon. These opinions were presented as testimony to the Oregon Public Utilities Commission at hearings in Klamath Falls.

Roster (1976), in his testimony before the P.U.C. hearings officer (Klamath Falls, March 1976), described mass feeding flights of nearly

800,000 birds in the Klamath Basin. Since these low elevation flights between marshlands and grainfields occur at dawn and dusk when visibility is poor, he feels that the proposed power line would present an especially dangerous obstacle.

If the birds should change their flight routes to avoid collisions with the power line, the result could be an adverse economic and recreational impact on Klamath Basin residents, especially if the birds move across the state line into California (Roster, 1976). The U.S. Fish and Wildlife Service indicates that landowners in Illinois were awarded compensations of up to $100,000 for decreased hunting opportunity attributed to a power line (Letter, U.S.F.W.S., 1976). Martin'ha (1974) states that duck shooting declined by two thirds after a power line crossed a Wisconsin hunting area, and that Canada geese in normal flight would not fly under the line.

The impact of a possible corona effect on these birds cannot be quantified, but if it is apparent during periods of bad weather it might disrupt feeding and migration flights to some extent.

It is not believed that the proposed route across the Klamath Basin would have a detrimental effect upon upland game birds in the area since it is already extensively roaded.

The proposed right-of-way would cross the Lost River near Merrill. The shortnosed sucker (*Chasmistis brevirostris*) is found in this stream and is considered threatened with extinction by the State of Oregon (Bond, 1973). Springs and running streams are essential for successful spawning. Siltation caused by poor construction practices could endanger local populations of this species by interfering with egg incubation and hatching and by destruction of aquatic vegetation needed in its food chain. Silt production could harm other fish and aquatic organisms and degrade water quality in Lost River in the vicinity of the proposed right-of-way.

Other aquatic habitat could be impacted where the proposed right-of-way would cross the Klamath River on the Topsy Grade south of Big Bend reservoir. While there are major non-anadromous fish species present in this section of the Klamath River, it is not believed that they would be impacted by the proposed construction due to the steep canyon of the river at this point. Presumably, towers would be high on the canyon walls away from the river.

Construction near the river at this point could introduce silt into the stream channel. Any road crossing and subsequent bridge and culvert construction here would cause siltation problems to fish and other aquatic life, through suffocation, egg destruction and loss of aquatic food and cover. Interference with fish movement could also result from improperly constructed crossings or culverts.

As the proposed right-of-way leaves Worden, it would enter into a coniferous forest vegetative type. This type continues intermittently to the top of the Green Springs, and is mixed with some brushland and broad sclerophyll types along the California Line after where the proposed right-of-way would cross the Klamath River. Right-of-way clearing along this segment could be destructive to the habitat of over 50 cavity-dwelling wildlife species which need dead trees for denning and nesting and a coniferous overstory to harbor their prey species. Species found in this area which depend on such habitat include certain hawks, owls, woodpeckers, flying squirrels, marten and possibly fisher.

By cutting through 34.5 miles of coniferous timber, the 175-foot-wide right-of-way could alter 732 acres of habitat for these species. The effect on these species is not known, but with the rapid cutting of other timber overstories in this area, the loss of 732 acres could be very detrimental to some species. It is not known if there are any state-classified threatened spotted owls along this segment of the proposed right-of-way.

The proposed right-of-way would go through approximately 20 miles of the Pokegama-Jenny Creek interstate blacktailed deer herd winter range. Much of the area used as winter range is brushfields interspersed with oak and conifers. An existing 230 KV line with wooden poles presently crosses this area, and goes over Soda Mountain to the summit of the Green Springs. The proposed line would follow part of this existing line. It does not appear that actual construction of the proposed line would have any great harassing effect on this deer herd unless construction took place during the winter. Loss of vegetative winter cover is of importance in this area, since good thermal cover is at a premium in much of the winter range.

Construction of a new access road, however, would provide a new eastwest route through the winter range that could result in harassment and poaching of wintering animals. This could result in forcing deer into very marginal range used only during extremes of cold and deep snow, and result in losses from starvation and malnutrition. Additional human use of the area could also result in loss of predacious animals and birds such as bears, cougars, coyotes, bobcats, eagles and hawks, and small mammals such as rabbits and squirrels through the additional hunting pressure caused by new access. Impacts are not quantifiable.

The Jenny Creek sucker (Catostomus rimiculus) regarded by Bond (1974) as a "Status undetermined" species, could be impacted adversely by siltation in Jenny Creek as a result of construction activities. Heavy silt in Jenny Creek could harm anadromous fish in the Klamath River.

Greensprings to Lookout Mountain Segment

This short, 5-mile-long segment would cross one mile of heavy coniferous timber, opening up a right-of-way of 21 acres. The rest of the route is grasslands with Oregon oak. The greatest impact in this area would be on wildlife species needing old growth timber habitat. Right-of-way clearing could have a serious adverse impact upon the threatened northern spotted owl. While it is not known if there are nesting pairs using the habitat within the proposed right-of-way, there are known populations nearby. Loss of old growth timber could result in the loss of nesting pairs since they have little available old growth left to move into. The better sites are probably already occupied by other pairs. Either way, a loss of habitat results in a loss of young birds through starvation, or predation by horned owls who move into open timber stands. Losses of even a few of these sedentary birds can put them into a very precarious position through inability to maintain populations.

The threatened western spotted frog (Oregon) might be found in this area, but it is not likely to be adversely affected by the proposed transmission line unless riparian habitat is destroyed. Another threatened species, the wolverine, has been found north of this area in the Cascades, but none have been reported this far south. Other "wilderness" species such as the cougar and fisher, can be forced out of their former habitat by construction activities and loss of timberlands affording security. Cavity-dwelling species would lose all of their habitat within the cleared right-of-way, thereby reducing populations.

Lookout Mountain to Medford Segment

This 18-mile-long segment would cross 11.5 miles of timberlands to the Antelope Creek drainage. Then it would pass through scattered coniferous and broad sclerophyll vegetative types. From Lookout Mountain to the head of Antelope Creek, the proposed right-of-way would probably remove about 244 acres of timber. Some spotted owls may be in this habitat. The proposed right-of-way would pass through some very good deer and upland game habitat composed of oak, scrub oak, madrone, manzanita and ceanothus of the broad sclerophyll vegetative type. New access into this area would provide additional recreation, but since the area is already over-roaded, further hunting pressure and off-season hunting, poaching and disturbance would tend to push wildlife from along the proposed right-of-way into other areas where habitat is marginal or already occupied.

This is the only part of the proposed right-of-way where anadromous fish might be detrimentally affected. Siltation of Antelope Creek and Dry Creek through road construction, etc., could cause an unknown loss of fish and other aquatic wildlife in Antelope, Little Butte and the Rogue River. It is only about 10 miles to the Rogue River from the proposed right-of-way terminus. Siltation of these waters could also

seriously affect the fishing in the Rogue River and Little Butte Creek. Agate Reservoir, a small reservoir off lower Antelope Creek, has good populations of crappies and bullheads. Heavy silt loads could diminish reservoir storage area, reducing habitat for these fish.

The proposed Medford-area substation would be located on a bench between Roxy Ann Butte and Little Roxy on the head of Dry Creek. It would remove about 12 acres of small game habitat in a mixture of oak, grass and some shrubs. This general area has a good California quail population, together with silver grey squirrels, California ground squirrels, and seven species of woodpeckers. Deer are found within the general area. Construction of the substation would have an immediate adverse impact on these species through destruction of 12 acres of habitat. In addition, some unknown areas of habitat would be lost to a service road leading to the site. Impacts are not quantifiable.

Summary

Road construction, right-of-way clearing and culvert placement could have the same detrimental effects on riparian vegetation, aquatic habitat and water quality as described in the preceding Midpoint to Malin discussion. Additional siltation in the Klamath River, and tributaries to the Rogue, could have adverse impacts on fish habitat through loss of spawning gravel, smothering of eggs, loss of benthic food supplies and greatly decrease water quality (Cordone & Kelley, 1961). This possible hazard could be compounded by eventual construction of additional transmission lines in the corridor that may be established by the proposed right-of-way.

The location and construction and maintenance of a power line road could produce potentially serious environmental impacts. Particularly detrimental practices include cut banks near streams and gullies and stream crossing without proper culverts.

Temporary loss of riparian vegetation could be detrimental to individual wildlife species since streamside cover provides shade and insects for aquatic wildlife, as well as food and cover for terrestrial birds and animals. The Klamath Basin lands are partiularly vulnerable to this type of habitat destruction due to the flatness of the terrain. Collisions with power lines would pose a threat to waterfowl populations.

Any human activity and harassment that would accompany construction and maintenance of the proposed transmission line could be detrimental to the 32 wild horses found along this route, particularly during crucial periods of the year such as in the winter. Horse bands usually stay close to a home range, and loss of habitat of one band could force it into another stallion's home range resulting in fighting over harems, and subsequent displacement into marginal habitat. It is not known whether the presence of the proposed 500 KV transmission line would adversely affect wild horses, however the 765 KV line installed in the

midwest by the Ohio Power Company is reported by Young (1971) to disrupt movement of farm animals.

The construction and maintenance roads would allow further human harassment of horse herds, resulting in loss of habitat, possible disruption of free-roaming behavior, and illegal shooting or capturing of animals.

TABLE III-16 summarizes the potential adverse impacts of Pacific's proposed Malin to Medford right-of-way and 500 KV transmission facilities on wildlife and wild horse habitats.

TABLE III-16

ADVERSE IMPACTS ON WILDLIFE AND WILD HORSE HABITAT

MALIN TO MEDFORD

	Deer Winter Range Acres			Wild Horses Range Acres			(4) Forest Wildlife		(5) Waterfowl		(6) Raptors	
Segment	(1) Miles	(2) Direct	(3) Indirect	Miles	Direct	Indirect	Miles	Acres Affected	By No. Direct	of Sites Indirect	By No. Direct	of Sites Indirect
Malin to Stukel	15	3.0	19,200	0	0	0	0	0	0	0	0	0
Stukel to Green Springs	21	4.2	26,900	15	30	19,200	34.5	732	1	0	0	1
Green Springs to Lookout	5	1.0	6,400	0	0	0	1.0	21	0	0	1	1
Lookout to Medford	15	3.0	19,200	0	0	0	11.5	244	0	0	0	1
Totals	56	11.2	71,900	15	30	19,200	47	997	1	0	1	3

(1) Estimated miles of power line passing through crucial big game or horse habitat.

(2) Based on 2 acres of vegetation temporarily removed per mile of power line construction.

(3) Based on effects of cars and people on animals 1 mile on each side of the road. (Lineal miles x 2 x 640 acres per sq. mile)

(4) Loss of timber computed at 21 acres/mile of right-of-way, for species requiring old growth timber including cavity nesters requiring snags and dead trees.

(5)(6) "Direct" means that the route crosses through crucial production or migration area. "Indirect" means route passes close enough to above areas to adversely affect species.

(7) Raptors in last 2 segments refer to spotted owls.

ARCHAEOLOGICAL AND HISTORIC VALUES

Midpoint to Malin

Pacific's proposed Midpoint to Malin right-of-way and transmission facilities would have potentially high adverse impacts on archaeological and historical values.

The proposed right-of-way would pass over or in close proximity to 73 identified archaeological sites, eight known historic sites, including the Stone Bridge which is on the National Register of Historic Places, and also cross two historic trail routes. In addition, it would allow for increased public access, for a distance of about one mile on each side of the proposed right-of-way, with a probable increased rate of cultural and historical site vandalism.

Adverse impacts upon archaeological and historical sites along the proposed right-of-way could result from:

1. The physical impact of tower placement, road construction, and other construction activities;

2. Archaeological site vandalism resulting from construction of access roads and trails into areas which are currently inaccessible or accessible only with great difficulty;

3. Site vandalism by construction employees;

4. Visual impact upon sites of potential National Register quality, including the Stone Bridge which is on the National Register of Historic Places and within visual distance of the proposed transmission line. Primary impact would result from visibility of a major manmade feature and the attendant reduction in the setting of the cultural feature.

It is not possible to quantify the impact of items 1 through 3 until exact locations of land-disturbing activities associated with construction of the proposed transmission line are known. At that time it would be possible to determine the number of culture resource sites which would be affected.

It is also impossible to predict the extent of archaelogical site vandalism resulting from the activities of employees constructing the transmission line, and from providing improved access into archaeologically sensitive areas. It may be predicted, however, that the adverse effects upon cultural resource sites resulting from improved access into areas which are currently inaccessible or accessible only with difficulty would be great.

The proposed right-of-way would pass about one-half mile from the Stone Bridge and Oregon Central Military Road. Construction of the transmission line along the proposed route would have an adverse visual impact upon this National Register of Historic Places site because it would be visible to people visiting the site. In compliance with the National Historic Preservation Act of 1966, Executive Order 11593, and 36 CFR Part 800, this statement is being forwarded to the Advisory Council on Historic Preservation for review and comment in accordance with Section 106 of the National Historic Preservation Act of 1966 and Section 2b of Executive Order 11593.

The Idaho and Oregon State Historic Preservation Offices have provided information as to National Register quality sites that could be affected by the proposed transmission line route. Sites and potential impacts cannot be fully quantified until final route selection is made and a detailed cultural investigation made of all areas that could be affected by ground-disturbing activities associated with the project.

Impacts upon National Register quality sites by the proposed project, are, however, to be expected. An example would be the proposed route crossing of the Oregon Trail. Without specific information from the State Historic Preservation Officer for Idaho as to which sections of the trail are of National Register quality, it is not possible to adequately discuss the potential impact of the proposed project upon this trail.

Visual impacts on historic sites (TABLE III-17) are assessed using the following procedure, based upon three separate variables:

1. Historical Significance - the overall significance of the feature including its frequency of occurrence, condition, extent and authenticity. It is measured on the basis of High (H) - one of a kind, unique to the region; Medium (M) - several sites in the region; Low (L) - sites common in the region.

2. Historical Setting - measured on the basis of High (h) - original, generally free of discordant modification; Moderate (m) - some modification of original setting, no major discordant features; Low (l) - extensive modification of original setting including major discordant features.

3. Visual Contrast - see Esthetics, Chapter III.

The following example is given to help the reader understand how degree of impact in TABLE III-17 is derived.

Assume that:

Historical significance is high (H)

Historical setting is moderate (m)

Visual contrast is low

Find the column with high historical significance (H) and moderate historical setting (m), shown as H_m on the chart. Follow the column down until it intersects the low visual contrast column. The impact would fall into the moderate impact category.

A quantitative estimate of the potential impact of the proposed right-of-way and transmission facilities upon archaeological resources can be obtained by making the reasonable assumption that the 73 known sites are a fraction of the number of sites located along the proposed right-of-way.

The fact that 73 archaeological sites have been identified along the applicant's proposed route means that at least this number of sites could be disturbed or destroyed by the proposed project.

The number of sites potentially affected by the Catlow Junction to Malin Segment of the proposed right-of-way and transmission facilities is increased because the proposed right-of-way would pass along an abandoned beach of Goose Lake. The archaeological sites along this beach contain the record of human activities at the time when Goose Lake was significantly higher than it is today. The possible age of these sites, plus their location in a poorly understood archaeological area underscores their potential scientific value. It is unlikely that transmission line construction could be accomplished in this area without damaging at least some of these sites.

The most sensitive archaeological zone along the Catlow Junction to Malin Segment occurs in the Warner Valley. Four archaeological sites and a National Register property (the Stone Bridge) and Oregon Central Military Road are located along the proposed route; over 50 archaeological sites occur within ten miles of the proposed right-of-way and may be susceptible to increased vandalism due to improved access (David L. Cole, personal communication).

Malin to Medford

As discussed in Chapter II, five archaeological sites were identified along this portion of the proposed route. Impacts, and rationale, would be the same as for the Midpoint to Malin portion of the proposed transmission line.

No historical sites are known to exist.

		Historical Significance - Historical Setting								
		H h	H m	H l	M h	M m	M l	L h	L m	L l
Visual Contrast	High									
	Moderate									
	Low									

High Impact Moderate Impact Low Impact

TABLE III-17

VISUAL IMPACT OF PROPOSED POWER LINE

HISTORIC SITES

Proposed Power Line as Viewed From	Type of Intrusion	Historical Significance	Scenery Class	Visual Contrast	Degree of Impact
Oregon Trail	Trail Crossing	H	l	H	H
Three Island Crossing State Hist. Park	Partial Visibility	H	m	L	M
Robertson Cave	Partial Visi- bility	L	m	L	L
Stage Station Site	Partial Visi- bility	L	m	L	L
China Gulch Massacre Site	Partial Visi- bility	M	m	L	L
Oregon Central Military Road	Trail Cros- sing(2)	M	h	H	H
Borax Works	Partial Visi- bility	M	m	L	L
Stage Station Site	Partial Visi- bility	L	m	L	L
Stage Station Site	Partial Visi- bility	L	m	L	L
Stone Bridge Site & Oregon Central Mili- tary Road	Partial Visi- bility	H	h	H	H

LAND USE

Midpoint to Malin

Grazing

Impacts on range use would result from loss of vegetation (forage) for domestic range livestock. The construction phase would involve a temporary loss of grazing area and the operation and maintenance phase would involve a smaller loss in area, but on a permanent (life of project) basis.

TABLE III-18 shows by segment the acres of grazing land that would be temporarily and permanently lost by construction and operation of the proposed facilities. Grazing lands are those in the desert shrub, grass, and juniper vegetative types (see Vegetative section).

No detailed range forage survey of the proposed right-of-way was made to determine exact carrying capacity. General averages for vegetative types were utilized. TABLE III-19 contains the estimated Animal Unit Months (AUM's) that would be lost, assuming an average of 2 acres per AUM for grass types, and 15 acres per AUM for shrub and juniper types (the grass types are primarily range seedings).

The construction phase would result in some disruption of grazing patterns, but they should be minor in nature - as domestic livestock adjust rapidly to human activity. From observation of existing 500 KV lines it does not appear that grazing patterns are disturbed to any extent by operation and maintenance activities.

Construction activities could also involve the possibility of damage to existing range improvements; primarily fences, cattleguards and gates. Quantification is not possible until final design and construction plans are completed. There could also be an unquantifiable increase in fire hazard.

Forestry

Tall commercial forest trees would have to be cleared from the entire 175-foot-wide right-of-way, and vegetation maintained at a low height. The practical effect is that timber production would be permanently lost for the entire right-of-way. Bureau of Land Management and Forest Service data shows that of the forest lands involved, 329 acres are commercial forest land with a growth potential of 93,000 board feet per year. This represents a dollar value of $13,950, based on present timber market values ($150.00 per thousand board feet); and a loss of approximately one-half man year in wood products employment.

It would be possible to grow trees for harvest at a relatively small size for chipping. However, based on today's utilization standards

TABLE III-18

IMPACTS ON RANGELANDS - MIDPOINT TO MALIN

Segment	Acres Lost Construction Phase (Temporary-6 years)	Acres Lost Operation & Maintenance (Permanent)
Midpoint to Hagerman	49	22
Hagerman to Owyhee	255	140
Owyhee to Catlow	181	104
Catlow to Malin	270	154
Total	755	420

TABLE III-19

ANIMAL UNIT MONTH REDUCTIONS - MIDPOINT TO MALIN

	AUM's Lost Annually				Total AUM's Lost
	Temporary		Permanent		Over 50-Year
Segment	(1 Yr.)	(6 Yrs.)	(1 Yr.)	(44 Yrs.)	Project Life
Midpoint to Hagerman	7	42	3	132	174
Hagerman to Owyhee	33	198	18	792	990
Owyhee to Catlow	16	96	10	440	536
Catlow to Malin	34	204	18	792	996
Total	90	540	49	2,156	2,696

and market conditions this would be a very minor offset to the value that would be lost.

The present timber volume of 2,106,000 board feet would have to be cleared. However, this would not be a "loss" as the volume would be harvested and reach the market.

There would be the possibility of an increase in the hazard of man caused fires, particularly during the construction phase.

Timber stands in the vicinity of the proposed right-of-way, the majority administered by the Forest Service, are commonly selectively logged. The Forest Service has identified the following impacts on management of timber lands adjacent to the proposed right-of-way:

1. Timber stands would not be thinned to maximum growth standards but would be reduced to maintain more escape cover for wildlife.

2. The Forest Service would refrain from complete overstory removal within 150 feet of the outer edge of the proposed right-of-way.

3. In some areas there would possibly be more "harvesting from below." That is, removal of small material for the chip market in conjunction with recovery of chipable material within the right-of-way.

The net effects of these measures on timber production adjacent to the proposed right-of-way cannot be quantified at present.

Agriculture

Clearing and disturbance during construction would eliminate 66 acres of cropland from production on a temporary basis (TABLE III-10). This impact should be no longer than a one-year period.

After construction, operation and maintenance activities would affect agricultural lands only to the extent of the area actually occupied by towers. The area within the tower base and immediately adjacent (approximately .015 acre per tower) would be lost for crop purposes. TABLE III-20 shows the agricultural land that would be impacted.

Data is not available on the exact type and yield of crops on the land that would be crossed by the proposed right-of-way (see Chapter II). Impacts would be minor due to the relatively small amount of agricultural lands affected on a regional, or even local, basis.

TABLE III-20

IMPACTS ON AGRICULTURAL LANDS - MIDPOINT TO MALIN

Segment	Acres of Agricultural Land Lost Temporary (One year)	Permanent
Midpoint to Hagerman	16	0.5
Hagerman to Owyhee	38	1.2
Owyhee to Catlow	0	0
Catlow to Malin	12	0.4
Total	66	2.1

As agricultural use involves the use of machinery and irrigation equipment in cultivation and harvest, there would also be certain non-quantifiable impacts involved in operation of the proposed project. High voltage transmission lines can cause induced voltage in metal pipelines and machinery in their near vicinity. Rubber tire equipment can build up a certain amount of static electricity near energized power lines, and there would be certain hazards to equipment operation for this reason.

There are definite hazards to sprinkler irrigation under extra high voltage transmission lines. The proposed right-of-way would be in near proximity to lands so irrigated in agricultural areas of southern Idaho. Exact location and quantification of such areas is not possible until final line design is completed. If sprinkler irrigated lands were impacted, they would not necessarily be lost to agricultural use--but irrigation methods would have to be altered.

Urban-Suburban-Commercial-Industrial

The proposed route would avoid communities, population centers, and highly developed areas. However, some residential use would be impacted. Residential use is small in magnitude (only 10 residences within 1,000 feet of line according to Pacific's environmental assessment) with a total of 90 residences within a one-half mile of the proposed route.

Other than visual effects, the main impacts on residential use would result from audible noise from the transmission line, possible radio noise and interference and television reception interference.

Audible noise levels from the line would vary with atmospheric conditions. It would be highest during conditions such as fog, rain, and snow. At the worst, the noise levels would be comparable to the level of average conversation or a typical business office and would not be adversely noticeable for any great distance beyond the edge of the proposed right-of-way.

Radio interference would depend on many factors, including distance of receiver from the line, strength of incoming signals and atmospheric and weather conditions. Even under adverse conditions, radio interference would not extend very far beyond the proposed right-of-way.

Television reception interference is caused by much the same factors as radio interference, but more often results from faulty insulators and gap discharges. VHF low band channels 2 - 6 experience interference in areas of weak signals, but other television channels are seldom affected by power lines.

There would also be impacts on nearby residential uses from the temporary disturbing noises of such activities as heavy equipment operation, equipment repairs, etc.

There would be some risk of induced voltages and currents in metal structures and equipment in the immediate vicinity of the proposed line. This "shock hazard" would apply to residential as well as agricultural use.

Special Land Uses

Special use sites and areas are tabulated in the Land Use discussion of Chapter II.

No such special use sites and areas would be impacted by the proposed right-of-way and transmission facilities. The right-of-way would pass within right-of-way and transmission facilities. The right-of-way would pass within 2 to 3 miles of the boundary of the Saylor Creek Air Force Range where low-level night-time flight training is conducted. Such operations necessarily involve a certain risk of collision with transmission lines in the vicinity. Even one collision would be a significant impact as it would probably result in the loss of human life and several million dollars in property damage.

A hazard common to all land uses is the risk of destruction of public land survey monuments and private property corner markers during construction activities.

Malin to Medford

Grazing

No detailed range survey of the proposed right-of-way was made. Estimated losses are based on general averages of carrying capacity for the vegetative types involved. Carrying capacity is expressed in acres per animal unit month (AUM).

TABLE III-21 shows by segment the acres of grazing land that would be temporarily and permanently lost by construction and operation of the proposed facilities. TABLE III-22 contains the estimated Animal Unit Months (AUM's) of forage that would be lost on a temporary and permanent basis, based on the grazing areas disturbed by construction and operation activities (grazing lands are desert shrub, grass, juniper, and broad sclerophyll vegetative types).

The construction activities could result in some disruption of grazing patterns for a very short period. Observation of existing 500 KV transmission lines has not shown any disturbance of grazing patterns due to operation. There could also be an increase in the hazard of man-caused fires.

Forestry

Commercial forest trees would be removed from the entire right-of-way and vegetation maintained at a low height. This acreage would be essentially lost to commercial timber production on both a temporary and permanent basis. For the proposed right-of-way, this would involve a loss of some 997 acres of timber land with an annual growth potential of 300,000 board feet. This would represent an annual loss of $45,000 based on present timber market values. ($150 per thousand and equates to approximately a loss of 1-1/2 man years of woods products employment.)

The present stand of timber on this acreage is estimated at 2,397,000 board feet. This would not really be a "loss" as it would be harvested and reach the market. See Midpoint to Malin section for discussion of possible effects on management of timber lands adjacent to the right-of-way. There would also be an increase in the hazard of man-caused fires.

Agriculture

Construction would involve temporary disturbance of about 19 acres of agricultural land (TABLE III-12). This impact should not exceed a one-year period. Operation and maintenance requirements involve only that land physically occupied by towers. This would represent a loss of 0.6 acres for the entire right-of-way (.015 acres per tower site).

These impacts would be minor due to the relatively small amount of agricultural land that would be affected.

TABLE III-21

IMPACTS ON RANGELANDS - MALIN TO MEDFORD

Segment	Acres Lost Construction Phase (Temporary - 6 Years)	Operation & Maintenance (Permanent)
Malin - Stukel	40	18
Stukel - Green Springs	15	9
Green Springs - Lookout	8	4
Lookout - Medford	25	19
Total	88	50

TABLE III-22

ANIMAL UNIT MONTH REDUCTIONS - MALIN TO MEDFORD

Segment	AUM's Lost Annually Temporary (1 Yr.)	(6 Yrs.)	Permanent (1 Yr.)	(44 Yrs.)	Total AUM's Lost Over 50-Year Project Life
Malin - Stukel	2.9	17.4	1.4	61.6	79.0
Stukel - Green Springs	1.8	10.8	1.0	44.0	54.8
Green Springs - Lookout	2.0	12.0	1.0	44.0	56.0
Lookout - Medford	4.4	26.4	3.6	158.4	184.8
Total	11.1	66.6	7.0	308.0	374.6

As agricultural use involves the use of machinery and irrigation equipment in cultivation and harvest, there would also be certain non-quantifiable impacts involved in operation of the proposed transmission facilities. High voltage transmission lines cause induced voltage in metal pipelines and machinery in the near vicinity. Rubber tired equipment can build up a certain amount of static electricity near energized power lines, and there would be certain hazards to equipment operation for this reason.

Urban-Suburban-Commercial-Industrial

The proposed right-of-way avoids communities and population centers. It would traverse very sparsely populated country. Effects on residential use would be very minor for the area as a whole - but very real and significant to those who would be affected.

Other than visual effects, impacts would result from construction activity noise, audible noise from the line, possible radio noise and interference, interference with television reception and induced shock hazards to metal equipment and structures as described in the preceding Midpoint to Malin discussion.

Special Land Uses

Special land uses in this area include a wildlife refuge, an airstrip, a radar facility, a lookout tower and three communication sites.

Refer to the Wildlife section for a discussion of the potential impacts on the Lower Klamath Wildlife Refuge.

The other special use sites listed above are far enough removed from the proposed line to avoid any specific adverse impacts.

Construction activities also entail the risk of destruction of public land survey monuments and private property corner markers.

TRANSPORTATION NETWORK

Midpoint to Malin

Construction of the proposed 500 KV power line would result in some increased use of both major and secondary road systems in Idaho and Oregon. Materials for the power line and substations would be transported by rail and stored in staging areas near the railroad--probably in Mountain Home, Idaho, and Lakeview and Klamath Falls, Oregon. Power line materials would be hauled to the proposed route by truck. Road systems would also receive some increased use by construction crews driving to and from the power line from their temporary quarters. As described in the socioeconomic section of this chapter, it is probable that construction crews would be dispersed in several communities in temporary quarters and may relocate several times. Therefore, specific impacts on the existing transportation systems are difficult to estimate.

The highways and roads expected to receive increased use by trucks hauling materials on site and commuter traffic to and from the job are:

Idaho

US 93 - Twin Falls to Shoshone

US 26 - Shoshone to I-80 near Hammett

US 30 - Twin Falls to Bliss

I-80 - Twin Falls to Mountain Home

US 95 - Caldwell to Jordan Valley, Oregon

State Highway 46 - Gooding to Wendell

State Highway 51 - Mountain Home to Bruneau

State Highway 78 - Bruneau to Murphy

State Highway 45 - Nampa to Murphy

Oregon

US 95 - Caldwell, Idaho to Jordan Valley

Jordan Valley to Rome Airstrip near VOR station

US 395 - Lakeview Area

State 39 - Klamath Falls to Merrill and Malin

The extent to which these highways would be used over the current use in vehicles per day or ton miles is not known. Secondary roads, including county roads, improved and unimproved roads presently existing, would very probably receive considerably heavier use than at present. For example, the area between US 95 between Burns Junction and McDermitt, Nevada, west to Lakeview, Oregon, is without major roads. It appears probable the existing roads between US 95 through Whitehorse Ranch to Fields, and between Adel and Lakeview would be extensively used. Other "jeep trails" and unimproved roads would be used during the construction period.

Malin to Medford

As outlined for the Midpoint to Malin section, construction of a power line from Malin to Medford would result in some increased use of primary and secondary roads for transportation of materials and men to the work site.

The highways most likely to receive increased use are:

State 39 - Malin to Klamath Falls

US 97 - Klamath Falls to Midland

State 66 - Klamath Falls to Medford

US 5 - Ashland to Medford

State 62 - Medford North

The unimproved roads and "jeep trails" presently existing in the area would receive increased use. The extent to which these highways and roads would be used over and above present levels of use in vehicles per day or ton miles is not known.

ESTHETICS

Midpoint to Malin

Since esthetics deal with visual perception of landscapes, any added physical element such as the proposed transmission line would affect different viewers in different ways.

There is no way to blend the proposed towers and conductors into the natural landscape to avoid all visual intrusions. Even where scenic values are relatively low, transmission towers and conductors would obviously stand out as unnatural landscape intrusions.

For purposes of this discussion, impacts on esthetic values are divided into two categories: (1) impacts resulting from construction of the transmission line; and (2) impacts resulting from the physical presence of the power line itself.

Impacts resulting from construction of the transmission line would be generally temporary and include such factors as increased human activity, vehicular movement, noise levels, dust, exhaust, litter and related disruptions in a generally undeveloped esthetic setting.

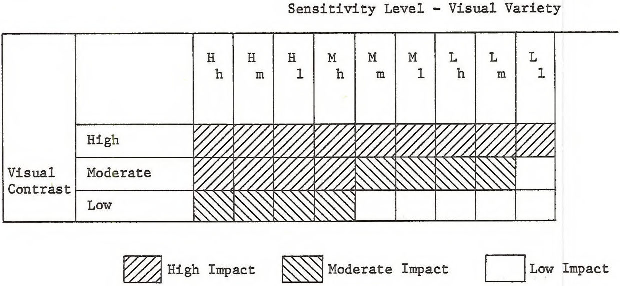
Construction impacts would vary from severe to relatively low depending upon the number of viewers exposed to the proposed operations. The number of viewers is subject to high annual fluctuation levels along portions of the proposed right-of-way, particularly during the deer and waterfowl hunting seasons.

The physical presence of the power line would result in impacts, for the most part visual in nature, through the introduction of an inharmonious manmade feature generally conflicting with the natural landscape elements of form, line, texture, color and scale. Power line visibility, the primary factor in esthetic impacts, would vary greatly depending upon distance, atmospheric conditions, light conditions, topography, vegetation and related factors.

The quantification of esthetic impacts is extremely difficult. The degree of specific impacts is dependent upon the number of viewers and their individual feelings and ideas regarding transmission lines, including their construction and maintenance. In order to be as objective as possible in assessing visual impacts, the following procedure, based upon three separate variables, was utilized:

<u>Sensitity Level</u> - measured on the basis of Class 1, High (H); Class 2, Moderate (M); and Class 3, Low (L). See Maps A-3 & B-3 in the Appendix of the Draft Statement.

Scenery Classification (Visual Variety) - measured on the basis of Class A, high (h); Class B, moderate (m); and Class 3, low (1). See Maps A-3 & B-3 in the Appendix of the Draft Statement.



The following discussion describes and assesses by right-of-way segment the significant esthetic impacts that would result from construction and operation of Pacific's proposed Midpoint to Malin right-of-way and 500 KV transmission facilities.

Visual Contrast - measured on the basis of High-demands attention, cannot be overlooked, dominates landscape; Moderate--attracts attention, visual change begins to dominate landscape; and Low--can be seen but does not attract attention, characteristic landscape dominates.

The following example is given to help the reader understand how the degree of impact in TABLES III-23 through III-29 is determined.

Assume that:

Sensitivity level is high (H)

Visual variety is low (1)

Visual contrast is moderate

Find the column with high sensitivity (H) and low visual variety (1), shown as H_1 on the chart. Follow the column down until it intersects the moderate visual contrast column. The impact would fall in the high impact category.

Midpoint to Hagerman Segment

TABLE III-23 summarizes the esthetic impact that the proposed power line would have on major features of the existing landscape in this segment.

U.S. Routes 30 and 93 and State Highways 25 and 46

The proposed right-of-way would cross these four major transportation routes with a 1972 total annual daily traffic of 7,800 vehicles. At each highway crossing the proposed transmission line would be visible over extensive distances (1 - 5 miles) due to the generally level terrain and open landscape character of the area. Visibility would be increased under reflective light conditions. However, all highway crossing visual impacts would be reduced by the presence of an existing 230 KV transmission line.

Snake River

The proposed crossing of the Snake River would result in an additional manmade intrusion adjacent to Lower Salmon Falls Dam with partial visibility from Malad Gorge State Natural Park and the proposed Hagerman Fossil Beds National Monument.

Visibility of the transmission line at the Snake River crossing would be magnified by the relatively steep terrain and open landscape character, particularly on the western shoreline, and would be particularly pronounced under reflective light conditions. Overall visual impact would be partially reduced by the presence of existing transmission lines across the Snake River. (See Figure II-27)

TABLE III-23

VISUAL IMPACT OF PROPOSED POWER LINE

MIDPOINT TO HAGERMAN SEGMENT

Proposed Power Line as Viewed From	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Degree of Impact
U.S. Hwy. 30	Hwy. Crossing	M	1	H	H
U.S. Hwy. 93	Hwy. Crossing	M	1	H	H
State Hwy. 25	Hwy. Crossing	M	1	H	H
State Hwy. 46	Hwy. Crossing	M	1	H	H
Snake River	River Crossing	M	m	H	H
Malad Gorge State Park	Partial Visibility	H	m	L	M
Proposed Hagerman Fossil Beds N.M.	Partial Visibility	H	m	L	M

Hagerman to Owyhee Junction Segment

TABLE III-24 summarizes the impact that the proposed power line would have on landscape features in this segment.

State Highway 50

The proposed right-of-way would cross this major transportation route with an average daily traffic of 180 vehicles and several secondary routes. At each highway and road crossing the proposed transmission line would be visible over extensive distances (5 miles) due to the generally level terrain and open landscape character of the area. Visibility would be increased under reflective light conditions.

Bruneau Sand Dunes State Natural Park

The proposed line would cross immediately adjacent to the southeast corner of the Bruneau Sand Dunes State Natural Park and traverse approximately four miles of land identified for future park expansion - buffer zone purposes. The proposed line would be visible from southern portions of the park including the summit of the primary dune formation. Visibility from the park would be particularly pronounced under reflective light conditions.

TABLE III-24

VISUAL IMPACT OF PROPOSED POWER LINE

HAGERMAN TO OWYHEE JUNCTION SEGMENT

Proposed Power Line as Viewed From	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Degree of Impact
State Hwy. 50	Hwy. Crossing	M	1	H	H
Bruneau Sand Dunes State Natural Park	Partial Visibility	H	h	M	H
Bruneau Valley	Valley Crossing	M	1	M	M
Pass Separating Silver City & S. Mountain	Owyhee Mts. Crossing	M	m	H	H
Boulder Creek	Skyline Visibility	M	h	H	H
Jordan Creek	Skyline Visibility	M	m	H	H

Transmission tower, conductor, line and maintenance road visibility, which is accentuated by the area's open landscape character, could represent at least to some park visitors, an esthetic intrusion conflicting with the park's overall setting. Bruneau Sand Dunes State Natural Park received an estimated 63,298 visits in 1973.

Bruneau Valley

The proposed right-of-way would cross the central portion of Bruneau Valley, a picturesque irrigated pasture-farmland area. The transmission line across Bruneau Valley could represent an inharmonious landscape intrusion to some residents and visitors (see Figure II-45).

Owyhee Mountains

The proposed right-of-way through the Owyhee Mountains would represent an inharmonious natural landscape intrusion through a relatively undisturbed

area of high to moderate scenic value. Visual impacts would result from transmission tower and conductor skyline visibility from portions of Jordan Creek (2 1/2 miles) and Boulder Creek (2 miles), (see Figure II-38 and II-39).

Although detailed visitor use data is unavailable, it would appear that many visitors are attracted to the area's generally undeveloped and scenic setting, together with its historic mining setting in relation to Silver City. Existing visitor use levels generally range from light to moderate through the area.

Owyhee Junction to Catlow Junction Segment

TABLE III-25 summarizes the impacts that the proposed powerline would have on the landscape character of this segment.

U.S. Route 95

The proposed transmission line would cross this major transportation route that has an average daily traffic of 690 vehicles, together with several secondary routes, including the Harney County road extending from State Highway 78 to Denio, Nevada, via the east face of Steens Mountain. The proposed transmission line would be visible for extensive distances, generally up to a maximum visual impact zone of 5 miles, due to the relatively level terrain and open landscape character of the area. Visibility would be increased under reflective light conditions.

TABLE III-25

VISUAL IMPACT OF PROPOSED POWER LINE

OWYHEE JUNCTION TO CATLOW JUNCTION SEGMENT

Proposed Power Line as Viewed From	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Degree of Impact
U.S. Hwy. 95	Hwy. Crossing	M	1	H	H
Owyhee River	River Crossing	M	1	H	H
Steens Mtn. Scenic Overlooks	Partial Visibility	H	h	L	M

The proposed right-of-way crossing of the Owyhee River would represent an inharmonious intrusion across a generally undisturbed canyon area which presently is under consideration for inclusion in the National Wild and Scenic Rivers System. Esthetic impacts would result from skyline visibility of transmission towers and conductors from the river. Visibility would be particularly pronounced under reflective light conditions.

The Owyhee River at the proposed crossing was used for 13 float boat trips (80 people) during 1974. Visitation by float boaters and other recreationists is expected to increase in the future whether or not the river is included in the National Wild and Scenic Rivers System. The potential impact is lessened because the proposed crossing is located near the terminus of the Three Forks to Rome float boat river trip. The potential impact is further lessened by other landscape intrusions (roads, farmland, and related developments) presently existing in the general vicinity of Rome. The Bureau of Outdoor Recreation indicates "the impact of the powerline as presently designed on wild and scenic river values is not considered significant" (BOR 1976)

Steens Mountain Overlooks

The proposed transmission line would cross about 21 air miles southeast of the 9500+-foot Steens Mountain summit scenic overlooks. Transmission towers and conductors, in all probability, would be visible from the summit of Steens Mountain, particularly under afternoon reflective light conditions. The potential visibility from the Steens Mountain summit scenic overlooks would be increased by the direct viewing angles and "viewshed" orientation (see Figure II-32).

The Bureau of Land Management administered Steens Mountain Recreation Lands receive an estimated 400,000 visitor days annually, with the Steens Mountain summit scenic overlooks being a primary visual attraction. The Steens Mountain Recreation Lands are of probable national significance, as evidenced by continued interest in National Recreation Area designation.

Long Hollow

In the Long Hollow area the proposed right-of-way would cross the proposed High Desert Trail. Degree of visual impact would depend upon actual development of the trail and the number of actual users. Potential visual impact would be partially reduced by the presence of an existing 115 KV transmission line (see Figure II-33).

Catlow Junction to Malin Segment

TABLE III-26 summarizes the impacts that the proposed powerline would have on the landscape character of this segment.

TABLE III-26

VISUAL IMPACT OF PROPOSED POWER LINE

CATLOW JUNCTION TO MALIN SEGMENT

Proposed Power Line as Viewed From	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Degree of Impact
U.S. Hwy. 95	Hwy. Crossing	M	1	H	H
State Hwy. 140 (Warner Mountains)	Hwy. Crossing	M	m	H	H
State Hwy. 140 (Goose Lake Valley)	Hwy. Crossing	M	1	H	H
Warner Valley Lake Co. Rd. 310	Valley Crossing	H	h	H	H
Lake Co. Rd. 313	Secondary Rd. Crossing	M	1	H	H
Stone Bridge Historic Site	Partial Visibility	H	h	M	H
State Hwy. 140 Parallel through Warner Mtns.	Skyline Visibility	M	h	M	H
Goose Lake Valley	Valley Crossing	M	1	M	M

State Highway 140 - Visual impacts would result from the "angular" crossing of the open Camas Prairie or meadow, situated in the Warner Mountains. Visual impact would be increased by the paralleling of State Highway 140 at a distance of approximately one mile (for a distance of about six miles), including occasional skyline visibility, through the Warner Mountains area (see Figure II-39). Visual impact would be further increased by required right-of-way clearing, and the subsequent modification of natural vegetative patterns, of mixed conifer vegetative type. Visibility would be particularly pronounced under morning and afternoon reflective light conditions. Annual daily traffic in 1973 on State Highway 140 at the crossing was 360 vehicles.

Visual impacts would result from the proposed transmission line crossing State Highway 140 on the western edge of Goose Lake Valley. The transmission line would be highly visable from the highway crossing in a north-south direction due to the open landscape character of the area. Visability would be particularly pronounced during periods of reflective light conditions. Annual daily traffic in 1973 on State Highway 140 at the crossing was 520 vehicles.

U.S. Highway 395 - Visual impacts would result from the transmission line ascending the scenic western slope of the Warner Mountains. Visual impact would be further increased by required right-of-way clearing of mixed conifer vegetative type and the subsequent modification of natural vegetative patterns, including creation of a tunnel effect. The transmission line would be highly visible from U.S. Highway 395 in an easterly direction for a distance of approximately two miles. Visibility would be particularly pronounced under afternoon reflective light conditions. Annual daily traffic in 1973 was 940 vehicles. Primary secondary transportation routes crossing visual impacts would be as follows:

Lake County Road 310 - Visual impacts would result from the transmission line crossing of a graded county road from Adel to Plush, a primary access route through the Warner Valley and Hart Mountain National Wildlife Refuge. The proposed transmission line would be highly visible from this crossing because of the open landscape character of the area. The transmission line would be seen where it would cross the narrows separating Crump and Hart Lakes and also where it would ascend Fish Creek Rim on the west. Average daily traffic in 1974 at the proposed crossing was 20 vehicles, a large percentage of which comprise recreation visitors to Warner Valley and Hart Mountain National Wildlife Refuge.

The proposed crossing of Warner Valley would represent an inharmonious natural landscape intrusion into a generally undeveloped and highly scenic esthetic setting. Transmission tower and conductor visibility along the southern base of Hart Mountain would represent visual foreground intrusion against a highly scenic backdrop (see Figures II-35 and II-37). Visibility of route across Warner Valley, as seen from Lake County Road 310, would be particularly pronounced under afternoon reflective light conditions. A significant number of Warner Valley visitors, including 23,326 visits to Hart Mountain National Wildlife Refuge during 1973, are attracted to the area by its highly scenic and undeveloped esthetic setting.

The proposed right-of-way would pass through Warner Valley within 1/2 mile of the Stone Bridge which is on the National Register of Historic Places. Transmission tower and conductor visibility from the Stone Bridge would adversely impact the site's historic esthetic setting.

Lake County Road 313 - Visual impacts would result from the transmission line crossing of a paved county road extending from State

Highway 140 to Plush, a primary ocean route to Warner Valley and Hart Mountain National Wildlife Refuge. The proposed transmission line would be highly visable from this crossing because of the open landscape character of the area. Visability would be particularly pronounced during periods of reflective light conditions. Average daily traffic in 1974 at the proposed crossing was 100 vehicles, a large percentage of which comprise recreation visitors to Warner Valley and Hart Mountain National Wildlife Refuge.

<u>Warner Ski Area</u>

The proposed transmission line would cross within less than 1 mile of the Warner Ski Area in the Warner Mountains. Transmission towers and conductors would be partially visible from the area, particularly the top and east slopes. Potential visual impacts would be partially reduced through the existence of cleared slopes, T-bar and other manmade ski area facilities. The Warner Ski Area received an estimated 5,500 visitor days of use during 1974.

<u>Goose Lake Valley</u>

Other secondary transportation route crossings of primary visual impact would include six Goose Lake Valley roads and 3 Fremont National Forest roads. Visual impact resulting from crossing of roads west of Goose Lake Valley, including Fremont National Forest roads, would be increased by required right-of-way clearing of the juniper - ponderosa pine - white fir vegetative type and the subsequent modification of natural vegetative patterns, including creation of tunnel effects.

Through Goose Lake Valley the proposed transmission line would be partially visible from the community of Lakeview and numerous ranch and farm residences. Visibility would be more pronounced during reflective light conditions. Impacts would vary depending upon individual residences and would be greatest for those immediately adjacent to the proposed right-of-way.

<u>Malin to Medford</u>

The following discussion describes by right-of-way segment the significant esthetic impacts that would result from construction and operation of Pacific's proposed Malin to Medford 500 KV transmission facilities.

Malin to Stukel Segment

Pacific's proposed transmission line would be partially visible against the foothill backdrop of Bryant Mountain, Buck Butte and Stukel Mountain and from the communities of Malin and Merrill, together with several scattered ranch - farm residences and 4 secondary road crossings. Visibility would be more pronounced during reflective light conditions.

Impacts would vary greatly depending upon the proximity of individual residents and would be greatest for those immediately adjacent to the proposed right-of-way.

Stukel to Green Springs Segment

TABLE III-27 summarizes the impacts of the proposed powerline on the landscape character of this segment.

TABLE III-27

VISUAL IMPACT OF PROPOSED POWER LINE

STUKEL TO GREEN SPRINGS SEGMENT

Proposed Power Line as Viewed From	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Degree of Impact
State Hwy. 39	Hwy. Crossing	M	1	H	H
U.S. Hwy. 97	Hwy. Crossing	M	1	H	H
Klamath Basin	Valley Crossing	M	1	M	M
Klamath River & Canyon Rims	River Crossing	H	h	H	H
Proposed Pacific Crest Trail	Trail Crossing	M	m	H	H

U.S. Highway 97 and State Highway 39

The proposed right-of-way would cross these two major transportation routes with a 1973 total annual daily traffic of 5,700 vehicles; and 3 secondary roads. The proposed transmission line at both major transportation crossings would be visible over extensive distances (5 miles) due to the generally level terrain and open landscape character of the Klamath Basin.

Klamath Basin

The proposed line would be partially visible across the Klamath Basin and Klamath Hills from the community of Worden and several scattered ranch - farm residences (see Figure II-47). Visibility would be more pronounced during reflective light conditions.

The proposed route would be partially visible from the northern portion of the Lower Klamath National Wildlife Refuge, a National Historic Landmark. Transmission tower and conductor visibility could represent, at least to some visitors, an esthetic intrusion conflicting with the refuge's overall undeveloped historical setting. Visibility would be accentuated by the areas open landscape character and would be particularly pronounced during periods of reflective light conditions. The Lower Klamath NWR received 75,000 recreation visits in 1975.

From the Klamath Basin to the Klamath River, the proposed transmission line would represent an inharmonious natural landscape intrusion to many recreation visitors through a relatively undisturbed area of moderate scenic value. Visual impact, particularly from U.S. Highway 97 and a secondary road on the east side of the Klamath River canyon, would be accentuated by right-of-way clearing of the mixed conifer vegetative type and the subsequent modification of natural vegetative patterns, including creation of a tunnel effect.

Klamath River

The proposed crossing of the highly scenic Klamath River canyon would represent an inharmonious natural landscape intrusion as seen by recreation visitors from the river and the canyon rims. Visual impacts would be accentuated by skyline visibility of transmission towers placed on the canyon rims or within the 1-mile-wide canyon, including any right-of-way clearing of the scattered conifer vegetative type (see Figure II-48).

Visual impact would be more pronounced during reflective light conditions. Although the specific number of viewers is not quantifiable, it is known that the Klamath River receives in excess of 30,000 visitor days of fishing use annually above Copco Lake.

Pacific Crest Trail

The proposed right-of-way would cross the planned location of the Pacific Crest Trail near the summit of Soda Mountain. Degree of visual impact would depend upon the number of visitors utilizing the trail following its construction. Visual impact would be partially reduced by the presence of three existing transmission lines (1-230 KV, 1-115 KV, 1-69 KV).

Green Springs to Lookout Segment

TABLE III-28 summarizes the impacts of the proposed powerline on the landscape character of this segment.

TABLE III-28

VISUAL IMPACT OF PROPOSED POWER LINE

GREEN SPRINGS TO LOOKOUT SEGMENT

Proposed Power Line as Viewed From	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Degree of Impact
State Hwy. 66	Hwy. Crossing	M	m	H	H

State Highway 66

The proposed transmission line would cross State Highway 66, with an average daily traffic of 770 vehicles. Visual impacts would result from the proposed transmission line ascending the moderately scenic slopes on both the north and south side of the highway. The visual impact would be further increased by required right-of-way clearing of the oak-conifer vegetative type, with the subsequent modification of natural vegetative patterns and would be more pronounced during reflective light conditions.

Lookout to Medford Segment

TABLE III-29 summarizes the impacts of the proposed powerline on the landscape character of this segment.

TABLE III-29

VISUAL IMPACT OF PROPOSED POWER LINE

LOOKOUT TO MEDFORD SEGMENT

Proposed Power Line as Viewed From	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Degree of Impact
Antelope Creek	Partial Visibility	M	m	M	M

Antelope Creek

The proposed route would cross 3 secondary roads and extend along the west slope of Antelope Creek, a narrow and moderately scenic canyon area including several scattered ranch - farm residences. The proposed Medford substation, which would occupy 12 acres near the lower end of Antelope Creek canyon, would be visually screened from the community of Medford and the Rogue River Valley by topographical relief.

Visual impact from road crossings and Antelope Creek would be accentuated by right-of-way clearing of the conifer - oak vegetative type and the subsequent modification of natural vegetative patterns. Visual impact would be more pronounced during periods of reflective light. Impacts would vary depending upon individual residences and would be greatest for those immediately adjacent to the proposed right-of-way.

General esthetic impacts would increase in proportion to the total number of future viewers and/or visitors. The Idaho Statewide Comprehensive Plan (1973) indicates a demand increase for pleasure driving of 78% between 1970 and 2000. The Oregon Statewide Comprehensive Outdoor Recreation Plan (1972 supplement) indicates a demand increase of 103% for pleasure driving between 1970 and 1990. The level of general esthetic impacts, of which pleasure driving is a component, can be projected to increase in direct relation to increased future sightseeing demands.

RECREATION RESOURCES

Midpoint to Malin

Impacts of Pacific's proposed transmission line on recreation uses and resources are directly related to effects on esthetic values. Recreation impacts relate primarily to the visual setting for sightseeing, deer hunting, upland game bird hunting, fishing and other extensive recreation activities along and adjacent to the proposed right-of-way. Although the proposed transmission line would remove no developed recreation resources or facilities from public use, its presence would reduce the quality of the recreational experience to varying degrees for an undeterminable number of visitors. The quantification of recreation quality experience reductions is made extremely difficult for several reasons including the lineal nature of the impact areas, the general lack of visitor use data and the lack of detailed studies required to determine visitor exposure or view time at critical locations along the proposed right-of-way.

The proposed transmission line, while providing increased hunting, rockhounding and related recreation access, could result in increased recreation visitor dispersement with an attendant increase in litter and archaeological historical site vandalism. The existence of the transmission line may encourage off-road vehicle use which would result in vegetative loss, soil erosion, wildlife harassment, noise, dust, and related recreation resource use conflicts and management problems (see Wildlife section). Although not specifically quantifiable, the impact of increased access on recreation resources are discussed by right-of-way segment.

Midpoint to Hagerman Segment

The proposed right-of-way crossing of the Snake River would result in some reduction in the sightseeing, picnicking, fishing and waterfowl hunting recreation quality experiences in the vicinity of Lower Salmon Falls Dam. The extent of potential recreation quality experience reduction is lessened through the presence of several existing parallel utility right-of-way crossings at the point on the Snake River. Visitor use data upon which to base recreation quality reduction estimates is not available, however, it is estimated that less than 3,000 visitors would be affected.

Some increase in general off-road vehicle use could occur along and adjacent to the proposed right-of-way. The extent of this increase and its subsequent resource impact, based upon other utility rights-of-way in the region, would be of a limited nature, resulting in some vegetative loss, soil erosion, noise, dust, wildlife harassment, and other recreation conflicts.

Hagerman to Owyhee Junction Segment

The proposed right-of-way through the Owyhee Mountains would result in some reduction in the sightseeing, deer and upland game bird hunting, trout fishing, camping, and "back country" exploration recreation quality experiences. Visitor use data upon which to base recreation quality experience reduction estimates is not available, however, it is estimated that about 6,000 people visit this area annually.

In the Owyhee Mountain area, the proposed right-of-way would cross through a portion of two Bureau of Land Management "back country study areas." The transmission line and related road would be an intrusion inconsistent with undeveloped or primitive characteristics of "back country." The right-of-way would be a primary factor affecting future study and decision regarding "back country," primitive or wilderness designation and management.

Through the Owyhee Mountains, the proposed right-of-way would provide increased deer hunting and general recreation access. The Idaho Game Management Units comprising the Owyhee Mountains were utilized by a total of 5,132 reported deer hunters in 1973. Although the number of hunters utilizing the specific right-of-way area is unknown, some significant increase in hunting and general off-road vehicle use could occur. The extent of vegetative loss, soil erosion, wildlife harassment, noise, dust, and other off-road vehicle impacts would be directly related to the extent of future use and is not quantifiable at this time.

Some increase in general off-road vehicle use could occur along the remainder of the proposed right-of-way. The extent of this increase and its subsequent resource impact, based upon other utility rights-of-way in the region, would be of a limited nature, resulting in some vegetative loss, soil erosion, noise, dust, wildlife harassment, and other recreation conflicts.

Owyhee Junction to Catlow Junction Segment

The proposed right-of-way across the Owyhee River would result in some reduction in the float boating recreation quality experience. The extent of their impact is estimated as follows:

Visitor Location	View 1/ Time	Number of 2/ People	Aesthetics 3/ Impacts	Man Days of 4/ Adverse Effects
Owyhee River	1/2 hours	80	High	4

1/ Amount of time the power line is in sight from river.
2/ Annual number of float boaters viewing power line (1974 data).
3/ See Esthetics - Chapter III.
4/ Twelve-hour visitor days or any part thereof.

The proposed right-of-way crosses the Owyhee River segment (Oregon - Idaho stateline to Owyhee Reservoir) included as a Section 5 (a) study river under the Wild and Scenic Rivers Act. The transmission line crossing of a river segment designated for possible inclusion in the National Wild and Scenic Rivers System could alter the river's ultimate classification and management.

The proposed right-of-way could result in some decrease in the recreation sightseeing quality experience for certain visitors to the Steens Mountain scenic overlooks through introduction of a major manmade landscape feature into the Alvord Desert view area. No data is available upon which to quantify this impact. It is known, however, that the Steens Mountain overlooks are a focal point for an estimated 400,000 visitors to Steens Mountain annually.

The proposed right-of-way would be a minimum of 5 miles northeast and 14 miles southeast of the Bureau of Land Manage Pueblo Mountains and Steens Mountain (east face) roadless study areas. Transmission towers and conductors together with the 5 acre reactor station near Fields, might be visible from higher elevations in both areas, particularly under afternoon reflective light conditions. Visibility of additional manmade improvements from these potential roadless study areas could affect future studies regarding primitive or wilderness designation and management.

Some increase in off-road vehicle use could occur along the proposed right-of-way. The extent of this increase and its subsequent resource impact, based upon other utility rights-of-way in the region, would be of a limited nature, resulting in some vegetative loss, soil erosion, noise, dust, wildlife harassment, and other recreation conflicts.

Catlow Junction to Malin Segment

The proposed right-of-way between Catlow Valley and Beatys Butte, would cross through a Bureau of Land Management roadless study area for a distance of approximately 11 miles. Evaluation of the approximate 70,000 acre high desert area, using the Bureau of Land Management's Recreation Information System criteria for primitive values, indicates relatively low primitive area qualities. A transmission line through this area would significantly alter the area's undeveloped esthetic setting, and, therefore any future studies regarding primitive or wilderness designation and management.

The proposed right-of-way across Warner Valley would result in some reduction in the historical (Stone Bridge and Central Oregon Military Road), zoological (waterfowl), geological and botanical sightseeing quality experience, together with a reduction in the nature study - photography and waterfowl hunting recreation quality experience. Visitor use data and detailed visual impact studies upon which to base accurate recreation quality experience reduction estimates are not available.

However, an estimated 5,000 people could be affected. The average summer traffic in 1974 on Lake County Road 310, the primary recreation access route through the impacted area of Warner Valley, was 61 vehicles per week. The adjacent Hart Mountain National Wildlife Refuge received an estimated 23,326 visits in 1974.

The proposed right-of-way through the Warner Mountains would result in some reduction in the sightseeing (primarily from State Highway 140), winter sports (Warner Ski Area) and deer hunting recreation quality experiences. Annual daily traffic on State Highway 140 in the Warner Mountains areas was 360 vehicles during 1973 while the Warner Ski Area received an estimated 5,500 visitor days in 1974.

The proposed right-of-way through the Warner Mountains and the interstate area (California-Oregon border) from Goose Lake Valley to Malin would provide increased deer hunting and general recreation access, which could result in a reduction of the deer hunting and general sightseeing experiences.

The Oregon Wildlife Commission Big Game Units comprising the Warner Mountains (Warner Unit) and the route area from Goose Lake Valley to Malin (Interstate Unit) indicate a total of 17,580 and 31,160 deer hunter days respectively in 1973. Although the number of hunters utilizing the proposed right-of-way area is unknown, some increase in hunting and general off-road vehicle use could occur. The extent of impact would depend upon future use levels and is not quantifiable at this time.

Some increase in general off-road vehicle use could occur along the remainder of the proposed right-of-way. The extent of this increase and its subsequent resource impact, based upon other utility rights-of-way in this region, would be of a limited nature, resulting in some vegetative loss, soil erosion, noise, dust, wildlife harassment and other recreation conflicts.

Malin to Medford

Malin to Stukel Segment

With the exception of some potential increase in general off-road vehicle use, no significant impacts on recreation resources or activities would occur along this segment of the proposed route. The extent of increased off-road vehicle use and its subsequent resource impacts, based upon other utility rights-of-way in the area, would be of a limited nature, resulting in some vegetative loss, soil erosion, noise, dust, wildlife harassment, and other recreation conflicts.

Stukel to Green Springs Segment

The proposed right-of-way across the Klamath Basin could result in some decrease in the waterfowl hunting and observation recreation quality

experiences, at least to certain recreation users. Visitor use data upon which to base meaningful recreation quality experience reductions is not available. However, an estimated 16,000 people could be affected.

The proposed right-of-way across the Klamath River would result in some decrease in the sightseeing and trout fishing recreation quality experiences. Visitor use data upon which to base accurate recreation quality experience reduction estimates is not available. The overall Klamath River receives in excess of 30,000 fishing visits annually above Copco Lake. The number of visits to the impacted portion of the Klamath River is not available.

The proposed right-of-way from the Klamath Basin to Green Springs would provide increased deer hunting and general recreation access which could result in some decrease in the general sightseeing and deer hunting recreation quality experience. Visitor use data upon which to base meaningful recreation quality experience reduction estimates is not available. However, an estimated 3,600 people could be affected. Although the number of hunters utilizing the area of the proposed right-of-way is unknown, some increase in hunting and general off-road vehicle use could occur. The extent of vegetative loss, soil erosion, wildlife harassment and off-road vehicle impacts is directly related to the extent of future use and is not quantifiable at this time.

Green Springs to Lookout to Medford Segments

The proposed right-of-way would result in some reduction in the general sightseeing, particularly from State Highway 66, and deer hunting recreation quality experiences. Visitor use data upon which to base recreation quality experience reduction estimates is not available. However, an estimated 4,000 people could be affected. Annual average daily traffic on State Highway 66 is 770 vehicles.

Some increase in general off-road vehicle use and attendant resource impacts, including landscape scarring, litter and wildlife harassment, could occur along the proposed right-of-way. The extent of potential impact is increased by the right-of-way's close proximity to Rogue River Valley population centers, including Medford and Ashland. The extent of potential off-road vehicle impacts is not quantifiable at this time.

General recreation use and impacts will increase in proportion to the total number of future recreation visitors. The Idaho Statewide Comprehensive Outdoor Recreatin Plan (1973) indicates a demand increase of 76% for fishing and 69% for hunting between 1970 and 2000. The Oregon Statewide Comprehensive Recreation Plan (1972 supplement) indicates a demand increase of 103% for both fishing and hunting between 1970 and 1990. Although data is not specifically available, other recreation activity demands (off-road vehicle use, floatboating, etc.) are projected to increase to the same extent as fishing and hunting.

Comprehensive Outdoor Recreatin Plan (1973) indicates a demand increase of 76% for fishing and 69% for hunting between 1970 and 2000. The Oregon Statewide Comprehensive Recreation Plan (1972 supplement) indicates a demand increase of 103% for both fishing and hunting between 1970 and 1990. Although data is not specifically available, other recreation activity demands (off--road vehicle use, floatboating, etc.) are projected to increase to the same extent as fishing and hunting.

SOCIOECONOMIC CONDITIONS

Both economic and social impacts would result from Pacific's proposed project through (1) impacts directly related to power line and substation construction activities, and (2) impacts from operation and maintenance of the proposed project.

Construction of this segment of the proposed power line would most likely involve two separate construction crews. Due to agreements between electrical contractors and electrical workers, construction contracts will probably be awarded on the basis of union jurisdictions. Idaho Local Unions of the International Brotherhood of Electrical Workers include all of Malheur County, Oregon. Oregon Local Unions of IBEW include those counties west of Malheur County.1/ For purposes of analysis a number of assumptions have been made:

1. At least two separate construction crews would be involved, probably under two different contracts.

2. Both of the crews would begin at the Malheur County line, one working east to the Midpoint Substation, the other working west to the Malin and Medford Substations. This assumption is made in order to consider the maximum impacts construction crews could have on the economic and social environment.

3. Temporary field camps would not be used. Certain cities would be designated as "permanent headquarters" for construction crews.1/

4. Construction crews would commute 100 miles or more from "headquarters" to a reporting point at or near the work site.

5. Only a small percentage of the construction crews would have families with them perhaps 10 percent.

6. Housing would be acquired by rentals, not sales; mobile home or camper space would be required along with hotel, motel, and efficiency apartments.

These assumptions are based on information supplied by Pacific, labor unions, and from observations of similar projects. Construction of the Jim Bridger power plant near Rock Springs, Wyoming and the associated power lines revealed construction crews will travel over 100 miles one way where basic facilities are limited or lacking. Normally, transmission line construction projects in relatively remote areas do not influence married workers to bring their families with them. The temporary nature of the work and the relatively large geographic area

1/ Agreement; Northwest Line Constructors Chapter, National Electrical Contractors Association and Local Unions No. 77, 125, 483, and 659; International Brotherhood of Electrical Workers; AFL-CIO April 1, 1975

involved encourages use of mobile homes and temporary quarters, and discourages permanent moves with purchase of homes.

A temporary increase in population would result from power line construction activities through the presence of the construction crews. For each segment of the power line (Malheur County line east to Midpoint, and Malheur County line west to Malin and Medford) construction would involve several distinct crews in sequence as described in Chapter 1. Cities chosen for permanent headquarters would not be known until the contracts are negotiated. However, it appears that these would logically be Boise-Nampa-Caldwell, Twin Falls, Idaho; and Burns, Lakeview, Klamath Falls, and Medford, Oregon. A 100 mile radius from these cities in relation to the proposed route is shown in Figure III-1.

In order to estimate population effects on these cites, a model of crew size and sequence was developed. Figure III-2 shows crew size, sequence, and progress over the eastern segment of the proposed route during a 21-month construction period (one additional month is shown to finish rehabilitation). Crew size can be estimated for a particular location on the route, or for a particular time period. An estimate of the crew size during the construction period (one additional month is shown to finish rehabilitation). Crew size can be estimated for a particular location on the route, or for a particular time period. An estimate of the crew size during the construction period is shown in Figure III-3. Similarly, Figure III-4 shows crew size, sequence, and progress over the western segment of the proposed route. An estimate of the western crew size during the construction period is shown in Figure III-5.

From the information it appears the east and west crews would reach their maximum or peak numbers during the first few months of the construction period. If construction started on each line segment simultaneously, there would be about 289 workers by the end of the third month of the construction period. Most of the workers would be working not more than about 25 miles each side of the Malheur County line in those first two to four months of construction. As the construction period progressed, the crews working on the east and west segments of the proposed project would progressively become farther and farther apart. Therefore, the greatest population effect would occur during the first few months of construction activities.

The "permanent headquarters" for workers on the eastern segment (Malheur to Midpoint) would probably be the Boise area - Boise, Nampa, Caldwell - for most of the project. Twin Falls could also be designated as "permanent headquarters" for part of the construction project. Because of the size of these cities and their ability to absorb additional people as described in Chapter II, the impacts of crew members living in these cities during the construction period would be imperceptible.

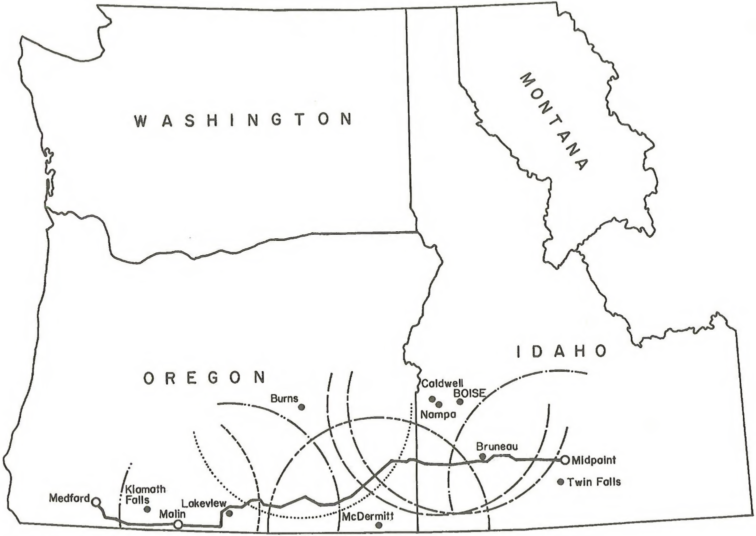


FIGURE III-1 100 MILE RADIUS-TRAVEL FROM:

TWIN FALLS

BOISE

NAMPA-CALDWELL

KLAMATH FALLS

BURNS

MC DERMITT

LAKEVIEW

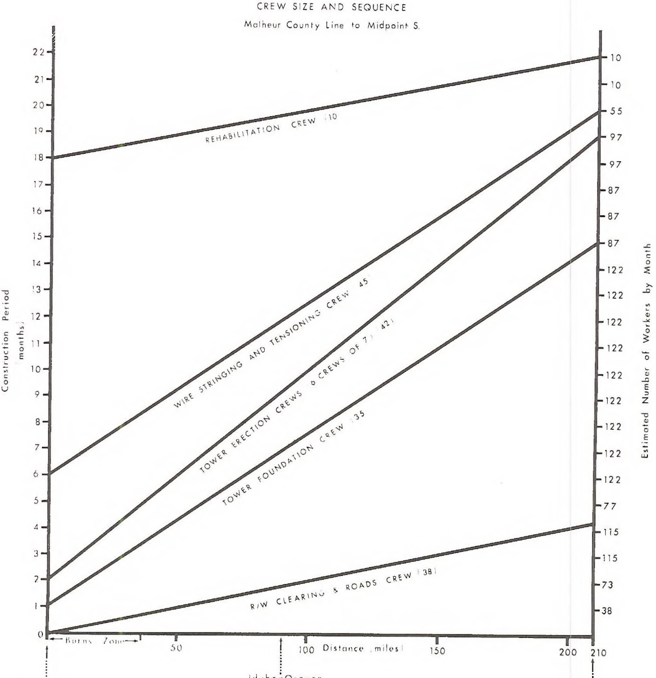


FIGURE III-2

CREW SIZE, SEQUENCE & PROGRESS
(eastern portion-Malheur Co. line to Midpoint)

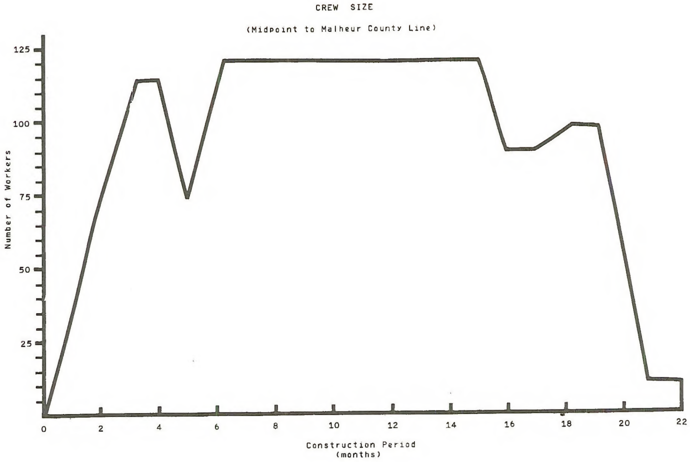


FIGURE III-3

ESTIMATED CREW SIZE
(eastern portion-Malheur Co. line to Midpoint)

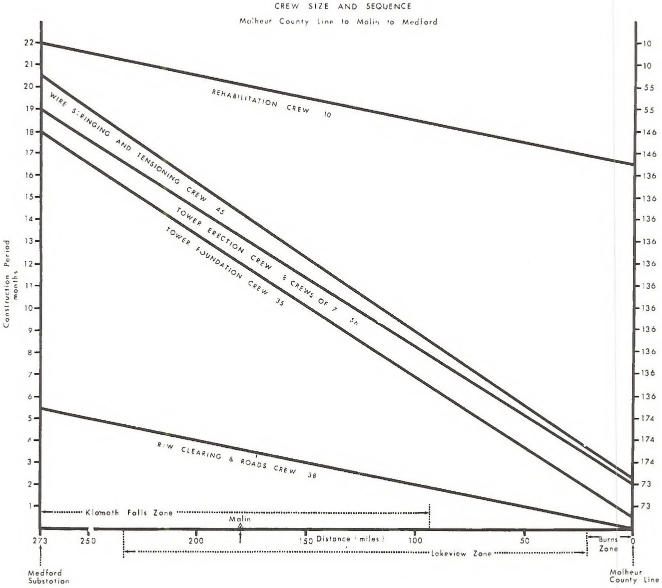


FIGURE III-4

CREW SIZE, SEQUENCE & PROGRESS
(western portion-Malheur Co. line to Medford)

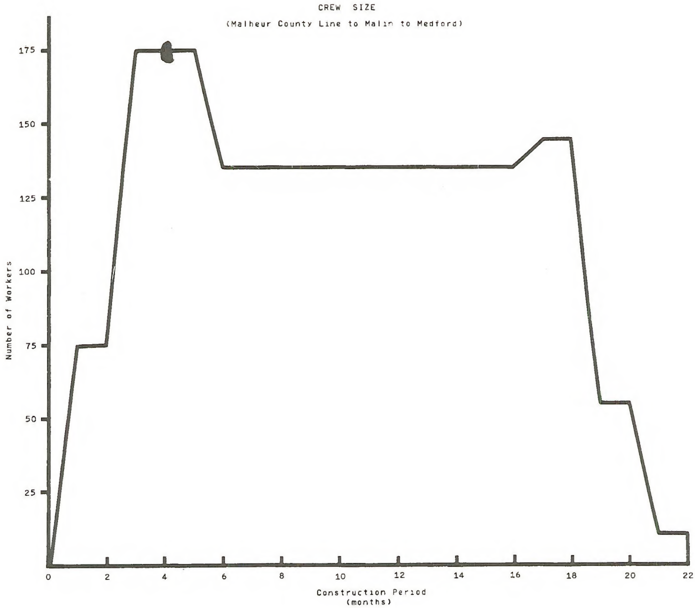


FIGURE III-5

ESTIMATED CREW SIZE
(western portion-Malheur Co. line to Medford)

The "permanent headquarters" for workers on the western segment (Malheur to Malin to Medford) would probably include Lakeview, Klamath Falls, Medford, and possibly Burns, Oregon. Both Medford and its suburbs and Klamath Falls would be expected to absorb additional people with little or no impact. It is doubtful if the total number of workers on this segment would be located in the same city. From information currently available, it is more likely that the construction crews would be dispersed in at least two or more locations. This would serve to lessen the population effect of the crews.

If Lakeview or Burns should be designated "permanent headquarters" for a portion of the construction period, some short-term adverse impacts would be expected. As described in Chapter II, these towns have somewhat limited housing, retail stores, services, and other facilities. If 50 to 100 persons located in these towns, housing would be in short supply, retail stores would experience increased business with possible shortages of some items, services such as automotive services might be at capacity. These adverse impacts would probably last only a few months.

It also appears probable that very small towns near the proposed route would experience some short-term adverse effects. Although these towns, such as Hagerman, Bruneau, Jordan Valley, etc., would not be designated "permanent headquarters" and would not house any of the crews, some effects could occur. Crews would probably purchase some items in these towns, and presence of the crews would be very obvious due to the small size of the communities. Cafes, grocery stores, hardware, recreation and other facilities and services could be overloaded for short time periods. Generally, the size of a community is directly related to its ability to absorb economic and social impacts (Wise, 1974).

There appear to be no lasting impacts on population stemming from construction of the power line.

Midpoint to Malin

Substation construction or modification would require manpower in addition to the power line construction. From available information, a crew of about 20 men would be required to construct additional substation facilities at the Midpoint substation near Shoshone, Idaho, which would take about 11 months. This crew would probably locate in Twin Falls. As described in the foregoing, impacts on population would be imperceptible.

A crew of about 8 men would be required to construct a compensating station near Fields, Oregon. The crew would probably locate temporary quarters at Fields for a period of seven (7) months. A small motel at Fields may be expanding facilities at this time to accommodate this increased use. An 8-man crew would more than double the population of Fields, but the 7-month time period would limit the duration of resulting adverse impacts. It is not known if additional motel units would be

utilized to any extent by the power line construction crews, but it is possible.

A crew of 15 to 20 men would be required to construct an addition to the Malin substation which would take about 11 months. This crew would most likely locate in Klamath Falls, Oregon. As previously discussed, the addition of 20 persons in Klamath Falls for 11 months would have no discernible impacts on population.

Employment in the trades and services sectors as a result of construction activities would not be affected in the larger cities designated as "permanent headquarters." Employment in these sectors could increase for short time periods in Burns and Lakeview.

Employment of crews for this proposed construction would probably utilize a high percentage of experienced persons in the southern Oregon-Idaho area. The firm awarded the construction contract would be expected to furnish engineers and foremen from the firm's permanent employees. The great majority of the construction crew would be composed of the experienced persons in the region. Journeymen linemen and associated workmen are generally mobile and move from one project to another. Strictly local residents of the communities near the proposed route would probably not exceed about 10% to 20% of the total work force.

From other sections of this report, it is estimated that about one-half man year employment would be lost in the forest products industry due to removal of timber along the proposed power line.

A percentage of the construction crews disposable income would be spent within the "permanent headquarters." The average wage earner in the United States spent his disposable income in 1973 as follows:

Housing	27 - 30%
Food	19 - 25%
Transportation	14 - 17%
Clothing	9 - 13%
Medical	6 - 9%
Recreation	4 - 5%
Other	1 - 3%

Engineers, inspectors, foremen, linemen, and other crew members would have permanent homes and families elsewhere, with some exceptions. Therefore, only about a third of their disposable income would be spent in the permanent headquarters cities. Based on an average wage of $470

weekly for 50 hours estimated by Pacific (exclusive of mileage or other allowances), and an average of about 93 persons per month during the east segment power line construction, an estimate of local spending can be made. An average of 93 persons per month earning $1,900 would approximate a monthly payroll of about $176,700 or a total of $3.9 million for the construction period for the eastern segment. Allowing for taxes and other withholding, disposable income would approximate a total of about $418,000 during the 11-month construction period. Disposable income would approximate $28,500 monthly or a total of about $313,500 during the project.

If the average worker spends about one-third of his disposable income locally, this eastern crew could spend about $53,130 monthly or a total of about $1,060,455 during the construction period. The great majority of this amount would be spent in the "permanent headquarters" cities.

Similarly, an average of about 117 persons per month on the western segment power line construction would approximate a monthly payroll of about $222,300 or a total of $4.9 million during the construction period (including Malin to Medford). Disposable income would approximate $166,725 monthly and about $3.7 million for the construction period. The Fields Compensating Station crew would earn an additional $15,200 monthly and about $106,400 during the 7-month construction period. Disposable income for this crew would be about $11,400 monthly and about $79,800 for the construction period. It is estimated that a total of about $1.25 million would be spent in the cities designated "permanent headquarters."

This spending for the Midpoint portion of the proposed project would not be expected to be significant considering the data contained in Chapter II. The total personal income in the seven Idaho counties and four Oregon counties exceeded $900 million in 1970.

From other sections of this report, some economic losses can be estimated if the proposed power line is constructed. The volume of timber which would be lost as annual growth from the timber removed would approximate $14,000 (93,000 b. f. annual growth x $150/1,000 b.f. = $13,950). It is estimated that 90 AUM's of forage would be lost for a period of about six years and that about 50 AUM's would be permanently lost. At a value of $5/AUM, this loss would be $250 which is miniscule considering the geographic area involved. Loss of about 70 acres of agricultural land would be expected to occur during construction with two acres permanently lost from agricultural production--a dollar loss of the annual crops and a decrease in the value of the land would probably be offset by purchase of easements or right-of-way.

The combined impacts of population increases, increased employment, and an increase in spending would probably be imperceptible.

Personal income would be affected for landowners along the proposed route. Purchase of easements or portions of land in fee simple ownership would provide additional income. Where farm and ranch operators face rising costs of production along with falling or fluctuating prices for their products, additional income could serve to lessen the economic woes of some and provide a buffer against uncertainty for others.

Idaho has a 3% sales tax on all tangible goods including hotel/motel accommodations and food. Oregon exercises a local 5% tax on hotels/motels and some other items. Some revenue would accrue to each state as a direct result of spending by the construction crews. For Idaho a rough estimate can be made by assuming that most of the disposable income crews spend in Idaho would be for taxable items. Further estimating that about $1 million may be actually spent in Idaho during the construction period, sales tax could amount to about $30,000.

National impacts resulting from this proposed power line are difficult to assess. It is estimated that about 33,810 tons of steel would be required for the total proposed project. In 1972, 13,979,000 tons of alloy steel were produced in the United States. Total steel production was 133,241,000 tons. The alloy steel required for construction of the proposed power line would represent less than .0025% of the total alloy steel produced in 1972. Considering the nation's total steel production, the proposed power line would represent only a small fraction of 1% (.00026%). National income and employment impacts resulting from producing and fabricating the steel for this proposed power line would be miniscule.

The proposed project would increase the demand for housing in the cities designated as "permanent headquarters." Particularly the demand for motels, efficiency apartments, and mobile home or camper space would increase. At the peak of employment, the crews working on the eastern segment of the Midpoint to Malin project would approximate about 142 persons. The crews working on the western segment of the Midpoint to Malin to Medford project, including compensating and substation crews, would be about 217 persons at peak. The demand for housing would not appear to result in adverse impacts, except possibly in Burns or Lakeview, Oregon. There appears to be no way to develop a reliable estimate of these adverse impacts based on information currently available.

The demand for social services of various kinds would increase during construction of the power line. Police and fire protection would be extended to the people associated with the construction crews. The addition of 100 to 200 persons in the "permanent headquarters" cities should not adversely impact police and fire protection services. Health services would be difficult to come by in some of the relatively remote areas along the proposed route. Accidents during construction would, in many instances, involve traveling long distances for medical treatment.

Since it is estimated 90% of the construction crews would not be accompanied by their families, adverse impacts on schools are not expected.

Impacts of the proposed construction on attitudes would vary. Individual proprietors and entrepreneurs would probably view the activity associated with construction of the power line as beneficial--both personally and for the community involved. Increases in trade and services would generally be viewed as desirable by most of the communities. However, a segment of the people would view the construction activities with obvious distaste. The construction activity may bring some disruption to the smaller communities; increased traffic, heavier use of local business, interference with livestock and farm operations, increased use of local recreation facilities, and others. The power line would cross areas in both Idaho and Oregon that are valued for their undeveloped state and accompanying wildlife, recreation and scenic values as described in other sections of this chapter.

The proposed 500 KV power line would be operated and maintained for an indefinite period. Transmission of 500,000 volts of power over the line, once constructed, would have no discernible impacts on the economy or social structure along the power line route. Maintenance activities of about six employees periodically examining the line would involve very minor impacts. Repair of facilities periodically would similarly involve miniscule economic and social impacts.

Operation and maintenance of the power line would result in new sources of revenue to some Idaho and Oregon counties and communities. Utility properties in both states are centrally assessed, with tax revenues apportioned to counties and cities. The taxes assessed on a utility system are prorated to counties and communities on the basis of the length of the facility which exists in the county. An estimate of the total annual tax revenues generated by the proposed power line can be developed by multiplying the market value of the completed power line x 20% for an assessed value x an average tax rate of .0784. Using a January, 1977 revised cost estimate of 131 million for the total proposed project, including substation and compensating station costs, the estimated annual tax yield is: $131,000,000 x .20 = $26,200,000 x .0784 = $2,054,080. Since about one-third of the Midpoint to Malin power line is located in Idaho and two-thirds in Oregon, the tax revenue would approximate $677,846 annually to Idaho and about $1,376,234 annually to Oregon.

In contrast to the short-term economic impacts resulting from construction activities, the tax revenues generated would continue for an indefinite time period. The share of the tax to each county would provide additional funds for schools, roads and other county and city services. The additional revenue would be particularly useful in the predominantly rural, low population counties. Tax revenues are considered to be more significant than the economic impacts resulting from the construction activities.

Malin to Medford

As in the Midpoint to Malin section, both economic and social impacts would result from the proposed action through (1) impacts directly related to power line and substation construction activities, and (2) impacts from operation and maintenance of the proposed power line. A number of assumptions have been made to facilitate an assessment of impacts:

1. Construction of this segment of the project would probably involve the same types of crews as the Malheur County line to Malin portion of the project.

2. Temporary field camps would not be used. Certain cities would be designated as "permanent headquarters."

3. Construction crews would commute 100 miles or more from "headquarters" to a reporting point at the work site.

4. Only a small percentage of the construction crews would have families with them--perhaps 10 percent.

5. Housing would be acquired by rentals, not sales; mobile home and camper space would be required along with hotel, motel, and efficiency apartments.

A temporary increase in population would result from power line and substation construction activities through the presence of the construction crews. As described in the foregoing section "Midpoint to Malin," it appears likely that a separate construction contract may be made for the portion of the project from the Malheur County line to Malin and on to Medford. For purposes of analysis, it is assumed that construction would begin at the Malheur County line and progress in sequence to the Malin substation and on to Medford. This assumption would allow an assessment of the greatest impact. In actual construction, the various crews (tower foundations, tower erection, etc.) may be more dispersed and impacts would be less than those estimated.

Cities chosen for "permanent headquarters" would not be known until the contracts are negotiated. However, it appears that these would logically include Klamath Falls, and Medford, Oregon for the Malin to Medford segment. Figures III - 3 and 4 in the previous section illustrate the size and sequence of individual crews. The maximum number of workers on the Malin-Medford power line construction would be about 136 persons. In addition, a crew of 15 men would be required to modify the Malin Substation and a crew of 20 men for construction of the Medford Substation. Due to the size of these cities and their ability to absorb additional people as described in Chapter II, the impacts of construction crews living in these cities during the construction periods would be imperceptible. It appears probable that smaller towns and suburbs near

the proposed route could experience some short-term adverse effects. Crews would probably purchase some items in these towns and the presence of the crews would be very obvious due to the small size of the communities. Cafes, grocery stores, service stations, and other facilities could be overloaded for short-time periods. Generally, the size of a community is directly related to its ability to absorb economic and social impacts (Wise, 1974).

There appear to be no lasting impacts on population stemming from construction of the power line and substations.

Employment in the trades and services sectors as a result of construction activities would not be affected in the cities designated as "permanent headquarters." Employment of crews for this proposed construction would probably utilize a high percentage of experienced persons in the southern Oregon area. The majority of the construction crews would be composed of experienced journeymen linemen and associated workmen who are generally mobile and move from one project to another. Strictly local residents of the communities mar the proposed route would probably not exceed about 10% of the total work force. From other sections of this report, it is estimated about 1 1/2 man years of employment in the forest products industry would be lost due to timber removal along the proposed power line route.

A percentage of the construction crews' disposable income would be spent within the "permanent headquarters." Since most of the crew members would have permanent homes and families elsewhere, it is estimated only about a third of their disposable incomes would be spent in the headquarters cities. Based on an average wage of $470 weekly for 50 hours estimated by Pacific (exclusive of mileage and other allowances) and an <u>average</u> of about 117 persons per month during power line construction, an estimate of local spending can be made. In the previous section, power line construction from the Malheur County line to Malin to Medford would generate a monthly payroll of about $66,500 or a total of about $617,500. Of this amount, disposable income would approximate $49,875 monthly and a total of $463,125. The Fields Compensating Station Crew would generate about $11,400 monthly and a total of $79,800 in disposable income.

Spending of all crews associated with the portion of the project from the Malheur County line to Malin and Medford, including substation crews, would approximate a total of about $4.2 million in disposable income. It is estimated that the Malin to Medford portion of the project alone would generate about $2 million in disposable income. If individuals spend about one-third of their disposable income, about $660,000 would be spent in Klamath Falls and Medford. Considering total personal income of $419 million in 1970 in Klamath and Jackson Counties, this income effect would not be significant.

From other sections of this report, some economic losses can be estimated if the proposed power line is constructed. The volume of timber which would be lost as annual growth from timber removed would approximate $45,000 (300,000 b.f. x $150/1,000 b.f. - $45,000). It is estimated that about six AUM's of range forage would be lost for a two-year period and about four AUM's permanently out of production. The value of this forage lost is considered miniscule. It appears that construction would take about five acres of agricultural land out of production for one year with less than one acre lost to continued agricultural production. This loss would probably be compensated by purchase of easements or rights-of-way by Pacific.

The combined impacts of short-term population increases, increased employment, and increased spending as a result of this project would appear to be minor when considering the Klamath Falls - Medford area. Total personal income in this area exceed $190 million in 1970. However, for very small towns, impacts could be more in evidence.

Personal income would be affected to some extent for private landowners along the proposed route. Necessary easements or purchases of portions of land in fee simply would provide a one-time source of additional income.

It does not appear that construction of the power line would result in any decrease in personal income due to changes in land use.

Some revenue would accrue to the State of Oregon as a direct result of construction activities, spending by construction crews, and through easements or right-of-way across lands owned by the state. Oregon exercises a 5% sales on hotels and motels and some other items. Sales taxes could amount to about $12,000.

Some increase in the demand for housing would result from construction activities -- particularly for hotels, motels, apartments, and mobile home space. At the peak of employment, total demand for housing could exceed 150 units. However, the demand will very likely be dispersed between Klamath Falls and Medford, and possibly suburbs of Medford. Adverse impacts of this demand should be miniscule.

Presence of the construction crews would result in some increased demand for social services of various kinds. Considering the existing facilities and services, impacts of increased demand appear to be negligible.

The impacts of the proposed construction on the attitudes of people would vary widely. Generally, individual proprietors and entrepreneurs appear to welcome growth and increase in employment and income. Some increase in trade and services would generally be viewed as desirable by most of the communities which could be directly affected by the project, even though the increase would be temporary. However, a segment of

people within the area, and perhaps over a relatively wide area in southern Oregon would view the construction activities with distaste. Since the construction would probably take place primarily in the late spring, summer, and fall seasons, construction activity would diminish the value of the area for outdoor recreation. The construction would disrupt some agricultural operations, particularly in the valley south of Klamath Falls. Individuals living in rural areas near the proposed project would experience some inconvenience brought about by construction activity.

This proposed 500 KV power line and associated facilities would be operated and maintained for an indefinite period, probably spanning several decades. The function of transmitting power over the line, once constructed, would have no discernible impacts on the economy or social structure of the region along the power line route. Impacts of additional power on the market area are discussed in another section. Route surveillance and repair of the facilities periodically would involve very small economic and social impacts.

Operation and maintenance of the power line would include a continuing state tax. Utility property is centrally assessed with revenue apportioned to cities and counties on a wire-mile basis. Based on the value of the utility system, taxes are assessed and prorated according to the length of a facility existing in a county. It is estimated that the total annual tax revenue generated by the proposed project would approximate $500,000.

In contrast to the short-term social and economic impacts associated with construction activities, the tax revenues generated by the project would continue for an indefinite period. The prorated share to each county would provide additional funds for several social services and facilities. Tax revenues are considered to be much more significant than the economic impacts of the construction activities.

MARKET AREA

The proposed project would essentially represent a new power source at the Malin and Medford substations. Pacific would transmit bulk power from the Jim Bridger facility near Rock Springs, Wyoming to the Midpoint substation via existing transmission lines; then the proposed project would involve transmitting bulk power from the Midpoint substation to the Malin substation. Since no substations are located between the Midpoint and Malin substations, all of the power carried by the proposed 500 KV line would be transmitted to Malin. The effect would be similar to a 1000 MW generating facility at Malin. From the Malin substation, bulk power could be transmitted to the proposed Medford substation as well as south into California or north to northwestern Oregon dependent on season of the year and other variables.

Provision of power to the market area to satisfy the current and projected demands for electric power is considered to be growth responsive and would result in many secondary impacts, both beneficial and adverse. Changes in resource use, income, employment, water and air quality, recreation opportunities, noise, crowding and other impacts could result from the availability of increased electrical energy. Electric power not immediately needed to meet the demand in the market area would be transmitted either into California or the Pacific Northwest. Considering the available information, there will be a growing power deficit in the Pacific Northwest. Electric power not used in the market area would be directed toward areas of demand for power. Without engaging in detailed studies of the complex interties of power transmission and distribution lines, it appears that the power would be used in response to growth with resulting beneficial impacts. The provision of electric power is considered to have no adverse impacts. The adverse impacts associated with construction and operation of the electric generating facilities in Wyoming have been considered in a previous environmental impact statement.

CHAPTER IV

MITIGATING MEASURES

Introduction

This chapter lists certain measures to mitigate environmental impacts. If the proposed project is approved, the Bureau of Land Management, U.S. Forest Service and the States of Idaho and Oregon would issue right-of-way permits to allow implementation of those portions of the proposed project on lands under their respective administration. These entities are obligated, under statutes and regulations, to specify stipulations in any right-of-way permit requiring certain physical actions intended to reduce environmental impacts.

Rights-of-way across private land would be subject to negotiations between Pacific and individual land owners. Pacific proposes certain measures to mitigate environmental impacts, which are listed later in this chapter, and would apply to all lands.

Federal Agency Mitigating Measures

Bureau of Land Management

Environmental impacts of the proposed action will be reduced by mitigating measures for soils and water resources. TABLE IV-1 lists the projected reduction in potential erosion that specific measures are expected to accomplish. TABLE IV-2 lists the project reduction of potential sediment that specific measures are expected to accomplish. All reductions shown are professional technical value judgments. The numbers shown are based on a percentage reduction of the erosion potential shown in Chapter III.

Measures for mitigating vegetative impacts of the proposed project will result in considerable recovery through rehabilitation. This assumes returning all temporarily disturbed areas to a near natural state of production. The time frame for reestablishment of ground cover would also be reduced. Tables IV-3 and IV-4.

Mitigating measures will reduce impacts on wildlife species and their habitats. Habitat would be protected or disturbance minimized by adjusting the season, area, or method of construction. In some instances wildlife habitat would be enhanced. See TABLE IV-5.

Measures for protecting archaeological and historical values will reduce losses by identification of those values, providing for their avoidance to the greatest possible extent, and salvage operations where unavoidable. All measures reflect requirements of existing statutes, regulations, and an executive order. Specifications in these mandates require such measures for all land, regardless of ownership.

It should be noted that while the salvage of the scientific and historic data contained in archaeological sites does help to mitigate the impact of disturbing activities upon these sites, it must none-the-less be seen as a last resort. Because even scientifically controlled excavations do destroy archaeological sites, in the sense that a completely salvaged site exists only in notes and museum specimens, such salvage should be employed only when preservation of the site is impossible or impractical.

Optimum mitigation of the adverse effects of the proposed project upon cultural resources could be realized only if:

a. the locations of all towers, roads, and other land distributing activities associated with the project were known;

b. each project associated construction activity which would have an adverse effect upon cultural resources could be relocated so as to avoid such adverse effects; and,

c. tower emplacement was such that no roads were constructed in archaeologically sensitive areas which are currently inaccessible or accessible only with difficulty.

Because the location of construction activities associated with the proposed project are not known, optimum mitigation of adverse effects upon cultural resources cannot be achieved. Given this situation, maximum possible mitigation of adverse effects of the proposed route upon these resources can be achieved through mitigating measure 22. In addition, the appropriate State Historic Preservation Officer will be notified of all significant findings resulting from survey or salvage work associated with the project.

Finally, it must also be realized that during transmission line construction, archaeological site looting by construction workers may be expected.

The impacts on esthetic and recreational values would be reduced by proposed mitigating measures. The effects that proposed mitigating measures would have on esthetic and recreational resources are shown in Chapter V, TABLE V-7.

Opportunities to mitigate the economic and social impacts discussed in Chapter III appear to be limited. Advance notice of the proposed construction project has already been given both by the Bureau of Land Management and Pacific. This could encourage individual entrepreneurs to plan to either expand or develop facilities to supply basic needs of the construction crews, thus mitigating adverse impacts. The degree of

mitigation would depend largely on the amount of expansion or development of temporary housing, mobile home parks, retail food, automotive services and others - which is presently unknown. In any event, it appears no Federal actions or measures can mitigate the adverse impacts.

State and local government agencies have authority to take action to mitigate socioeconomic impacts. Examples are land use planning and control laws and ordinances, which are optional.

Mitigating Measures

The following mitigating measures are written as right-of-way stipulations and would apply only if a right-of-way should be granted.

As a matter of regulation, the BLM permit for a right-of-way would contain the following language which would require Pacific to provide a bond to insure that all stipulations (mitigating measures) of the permit would be properly executed or the BLM be provided with an adequate sum of money to take appropriate corrective actions:

Bonding requirements:

Immediately upon issuance of an electrical power transmission line right-of-way easement grant necessary for construction of the line, Grantee shall furnish the United States a surety bond or other security (hereinafter called "Bond") of such type and on such terms and conditions as are acceptable to the Secretary of the Interior (the principal amount to be determined upon issuance of the permit). Said Bond would at all times be maintained in force and effect in the full principal amount until construction of the line is completed and until the Bond is released in writing by the Secretary of the Interior. Said Bond would have the purpose of: (1) Ensuring the meeting of each and every obligation of the Grantee under terms and conditions of this grant and any permit issued to Grantee by the United States in connection with the line; (2) providing for immediate payment to the United States of any cost or obligation incurred by the United States in performing any said obligation of grantee which, in the judgment of the Authorized Officer, Grantee has not performed satisfactorily; and (3) ensuring the payment within the amount of said Bond, of any final judgment recovered against Grantee for loss or damage to property of others, or for bodily injuries to or the death of any person in any way arising from or connected with the line.

These bonding requirements would be in addition to, and not intended to affect, all other requirements of law, nor would they be intended to limit in any way Grantee's liability under any provision of law.

1. Grantee shall make contractors and their employees aware of, and encourage them to abide by "Rules of Conduct," as stated in 43 CFR

6010.2 (1974) when operating on national resource lands administered by the BLM. This chapter should be available to all personnel and, consistent with the purposes of the lease or permit, the rules should be strictly followed.

These measures would prohibit destruction of natural features, objects of historic or scientific interest, and signs, markers or other public property. Since basic rules of conduct apply to all individuals on the land, and since it is recognized that not all persons would honor the "Rules," an unknown number of infractions are apt to occur.

2. Grantee shall abate any condition existing with respect to the line that would cause serious and irreparable harm or damage to any person or property. Any property or resource harmed or damaged by grantee in connection with the line would be reconstructed, repaired, and rehabilitated by Grantee to the written satisfaction of the Authorized Officer (43 CFR 2801.15(h)). Livestock, wildlife facilities, land improvements (fences, cattleguards, agricultural products), human life, roads and other rights-of-way improvements (pipelines, telephone lines) that might become damaged or destroyed during course of construction through fault of the Grantee or his contractor, would be rectified either monetarily or by replacement.

   Human and animal life cannot be replaced, but monetary compensation could be initiated to help ease such hardships. The measures would not mitigate direct impacts involved but would help eliminate accidental or careless damage to personal and public property situated in or near the proposed project.

3. Grantee shall do everything reasonably within its power, both independently and on request of any duly authorized representative of the United States, to prevent and suppress fires on or near lands to be occupied under the right-of-way, including making available such construction and maintenance forces as may be reasonably obtainable for the supression of such fires (43 CFR 2801.15(d)).

4. Grantee shall comply with applicable Federal and State regulations regarding protected plant species. Prior to construction, at Grantee's expense, a botanical search by a qualified botanist will be made for the presence of threatened or endangered plant species in those areas where they would be expected to occur. If such species are found along the route, the Grantee shall conduct construction activities in a manner to avoid or minimize disturbance to them as directed by the Authorized Officer.

5. Grantee will furnish the Authorized Officer a clearing and rehabilitation plan including, but not limited to, clearing methods, site preparation, plant species to be seeded, rate of seeding,

type of fertilizer and mulching to be used, and time of seeding of temporary roads and other disturbed areas.

This would allow evaluation of the rehabilitation plan to insure that areas with rehabilitation potential would have rehabilitation measures implemented. After implementation, the Authorized Officer would make an evaluation after the first growing season to assure that revegetation, in fact, was successful. Revegetation efforts would continue until the Authorized Officer had determined that satisfactory compliance had been made. It is recognized that not all lands could be fully rehabilitated.

6. Clearing of vegetation will be limited to that material which poses a hazard to the transmission line in areas outside tower sites and roads.

   Riparian vegetation, and particularly that of value to fish and wildlife that does not pose a hazard to the transmission facility, will not be destroyed.

7. Clearing, grading or other soil and vegetative disturbance will be held to the minimum necessary for construction.

8. Timber harvesting practices and road construction along the right-of-way in forested lands will follow the logging stipulations contained in the BLM timber sale contract and special stipulations attached thereto. In forested areas, clear only that timber necessary for safe operation of the line. Clearing and disposal of vegetation, including noncommercial species and sizes will be as directed by the Authorized Officer. In general the following items will apply:

   a. Restrict the clearing of vegetation to that necessary for surveying purposes, temporary road construction, assembling and erecting towers, and to provide required conductor clearance. Riparian vegetation will be disturbed only if unavoidable, and then only under the direct supervision of the Authorized Officer.

   b. Right-of-way clearing in canyons spanned by the line will be minimal--limited to that required to maintain clearance with the conductor.

   c. Trees and shrubs will be cleared by hand, particularly on steep slopes and rock areas where it will result in significantly less soil disturbance to the site.

   The amount of cutting prevented cannot be quantified since the quantity of wood products has not been cruised and is unknown. However, these measures should reduce the loss of habitat for wildlife species requiring standing live timber, dead snags, and dead and dying trees for cover, food, denning and nesting.

9. In all timbered and scenic areas, including juniper, limit right-of-way clearing width to minimum necessary to prevent interference of trees and other vegetation with the transmission facilities, except clearing shall be "feathered or graded" with curved or undulating boundaries to lessen the visual "tunnel" effect. In locations where the right-of-way enters timber, including juniper, from a meadow or other open area, the clearing shall be "feathered" into the timber in accordance with the approved clearing plan in order to retain maximum natural vegetative patterns. A landscape architect shall be utilized to assist in the design of the clearing plan.

Wildlife will also benefit from the uneven contoured "edge" effect produced by undulating boundaries.

10. During construction, maximum use of existing roads will be made whenever possible. Construction of new roads will be in accordance with an approved access plan submitted by the grantee.

This measure will insure the least disturbance to soil, vegetation, and water.

11. Wherever practicable, "cross country" access will be utilized without clearing of vegetation or grading of a road bed.

    This avoids scarring the land with unneeded roads and reduces disturbance of vegetation, wildlife habitat and maintains vegetative cover for soil protection.

12. To restrict cross-country travel to those routes approved by the Authorized Officer, there should not be more than one route to each site requiring access.

    This measure would minimize erosion and vegetative disturbance potential.

13. All construction and vehicular traffic is to be confined to the right-of-way or designated roads or trails unless otherwise authorized by specific written permission. Any roads to be used for construction only will be closed and rehabilitated after construction of the line in accordance with the approved rehabilitation plan.

14. From State Highway 51 in Little Valley, Idaho to Warner Valley, Oregon existing roads and trails will be used to the maximum extent possible. Any new approved construction roads will be closed and rehabilitated to the satisfaction of the Authorized Officer. Subsequent surveilance will be performed by aircraft unless otherwise permitted by the Authorized Officer.

Closing of access in this area will reduce the hunting pressure on scattered herds, and the harassment of wildlife in that general area up to 40%.

15. Every effort shall be made to avoid road locations in steep headwalls of drainages where sidecast of excavated material will increase the potential for mass wasting. If this is not possible, waste materials will be endhauled to a suitable disposal site as designated by the Authorized Officer.

    This measure helps reduce the potential for mass soil movement.

16. Stream crossings for temporary roads should utilize temporary culverts or bridges designed to carry a reasonable peak flow. Approaches to the crossings should be constructed to minimize sediment production. No construction that could cause sedimentation will be allowed in high runoff periods. DEQ and EPA standards will be met in all cases unless waived by the Authorized Officer.

    This measure helps protect the stream banks and results in less sediment production. No pumping will be allowed from springs, potholes, or other limited bodies of water known to contain threatened, endangered or unique fish species.

17. Removal of temporary culverts and bridges will be done in such a manner that avoids increased sediment as a result of the approaches (see 16). Stream channel characteristics should be as close as possible to the styles they were in prior to disturbance. All temporary and permanent structures across streams will be approved by the project biologist.

18. Topsoil from areas to be disturbed by tower sites shall be stockpiled and redistributed over the surface after the area is reshaped to conform to the original topography. Topsoil is defined as the surface six (6) inches of the undisturbed soil. This requirement does not apply to areas where the soil is less than six inches deep to competent bedrock.

    This would retain much of the soil's original productivity.

19. Applicant will string the "sock" line by helicopter through or across the Owyhee Mountains, Owyhee River, Warner Valley, all Fremont National Forest areas, Klamath River and other areas as specified by the Authorized Officers. Use of helicopters as opposed to ground equipment will reduce centerline clearing and the attendant increase in visual impacts resulting from landscape scarring in high value scenic areas.

20. When a road or construction activity in connection with the right-of-way breaks or destroys a natural barrier used for livestock control, the gap thus opened shall be fenced to prevent the drift of livestock. Said fences shall be constructed according to BLM specifications.

This measure will be 100% effective.

21. All existing range improvements affected by construction and maintenance of the right-of-way facilities shall be maintained in a serviceable condition at all times. In the event any such improvements owned by the United States, or its licensees, permittees, or lessees, are destroyed, immediate replacement or reimbursement by the right-of-way Grantee for its full value will be made as determined by the authorized officer.

This measure avoids the permanent loss of property.

22. Prior to construction, Grantee shall, using qualified professional personnel, make a survey and inventory of archaeological, paleontological, and historical sites within the area to be occupied by the right-of-way and the access roads. The results of this survey will be provided to the Authorized Officer. The Authorized Officer will require Grantee to relocate the proposed transmission line facilities in order to avoid destruction of archaeological, paleontological or historic values or to delay construction until salvage operations are completed. In the event archaeological, paleontological, or historical evidence is found during ground disturbing activities such as construction of temporary access roads, tower footings, pulling pads, substations and reactor stations, the Grantee shall immediately cease construction activity and notify the Authorized Officer. The Grantee shall not resume construction until a proper evaluation of the significance of the evidence has been made and the Authorized Officer provides the Grantee with written permission to resume construction. All costs of inventory, survey, evaluation and salvage operations will be borne by Grantee. All salvage shall remain the property of the United States.

23. Utilize nonspecular conductors and/or acid-treated steel tower in sensitive visual areas as identified by the Authorized Officer.

This measure would reduce the reflective light visual impacts, particularly in such areas as the Bruneau Sand Dunes State Park, Owyhee Mountains, Owyhee River, Steens Mountain scenic overlooks "viewshed," Warner Valley, Klamath River Canyon, together with selected major road crossings.

24. Locate towers as far back as possible from all major and secondary transportation routes in high desert and other open landscape areas. Locate towers in forested areas to retain maximum screening vegetation between highways or roads and towers. Major transportation routes include Interstate, U. S. and State highways. Secondary transportation routes include County, U. S. Forest Service, and Bureau of Land Management constructed and maintained roads.

This measure would lessen the visual impact from both major and secondary transportation route crossings. The visibility factor for all high desert highway and road crossings would remain generally high due to the area's open landscape character and lack of screening vegetation.

25. Locate tower structures adjacent to Jordan Creek and at the Boulder Creek crossing to minimize visual "skyline" effect on canyon rims as seen from Canyon bottom.

This measure would reduce visual impacts associated with transmission tower and conductor visibility from Jordan and Boulder Creeks.

26. Locate towers to avoid or minimize Owyhee River visual "skyline" effect as seen by float boaters on the river.

This measure would be partially effective in reducing visual impacts resulting from transmission tower and conductor visibility from the Owyhee River. The proposed right-of-way crosses the Owyhee River segment included as a Section 5 (a) study river under the Wild and Scenic Rivers Act. The Wild and Scenic Rivers Act, P.L. 90-542, as amended, affords Section 5 (a) study rivers substantially the same protection against development under Federal license, loan or grant and Federal construction programs, for a five-year period pending completion of Wild and Scenic River studies, as that afforded component rivers of the National Wild and Scenic Rivers System.

The Wild and Scenic Rivers Act does not preclude rights-of-way for public and private utilities, roads, pipelines or other purposes within study or component river areas.

27. Locate tower structures to minimize "skyline" visual effect on the Klamath River Canyon rims as seen from the river.

This measure would be partially effective in lessening the visual impact resulting from transmission tower and con ductor visibility from the Klamath River.

28. Locate tower structures as far back from the Pacific Crest Trail route as possible and retain maximum screening vegetation between the trail and towers.

This measure would be partially effective in lessening the visual impact of the Pacific Crest Trail crossing.

29. All road and trail development in construction and maintenance of the transmission line through the following sensitive areas must be approved in advance by the authorized officer:

    Snake River Crossing

    Owyhee Mountains (Snake River Plain to Oregon-Idaho State Line)

    Owyhee River Crossing

    Warner Valley (upper Fisher Canyon to top Fish Creek Rim)

    Warner Mountains (Fremont National Forest)

    Oregon-California boundary (Goose Lake Valley to Langell Valley)

    Klamath River Crossing

    All other aquatic habitats

    This measure would ensure minimal surface disturbance and reduce visual landscape intrusion while limiting recreation and off-road vehicle travel with its attendant increase in recreation resource problems and conflicts and prevent many wildlife conflicts. This measure would be effective in reducing visual impacts resulting from landscape scarring, particularly on canyon slopes, in moderate to highly scenic recreation use areas.

30. In order to effectively safeguard wildlife habitat and to see that accepted mitigative measures are followed, project wildlife biologists will be hired by the Grantee as an advisor to the Authorized Officer.

    Since the general plan is to begin construction from two separate points, it will be necessary to have two biologists. In addition to assuring contract supervision, the biologists will work closely with local, State and Federal wildlife representatives to assure that (1) adequate provisions are made for the safety of known and newly discovered endangered wildlife species along the route, and (2) to accommodate all wildlife problems unforeseen at the time of stipulation and mitigation preparation. The biologists will coordinate their supervision periodically to assure the uniformity of wildlife protection and will consult with fisheries experts when aquatic habitats are concerned.

These measures would be effective in assuring compliance with mitigative measures, and in finding crucial wildlife situations not covered by the EIS. The biologist's input into surveillance and protection could reduce overall impacts to wild life during construction by an estimated 50%.

31. Project wildlife biologists will inventory for threatened, endangered and unique fish and wildlife species along the route to assure protection and compliance with the Endangered Species Act of 1973. There will be no construction activities or roads allowed within 2 miles of any threatened or endangered active raptor nest sites to assure that the birds are not forced to abandon nest and young. This would eliminate at least 80% of the harassment of these species during the nesting and rearing season by construction activities. If the Authorized Officer determines that the transmission line could not be so located, no construction would be allowed along the line during the nesting and rearing season of February 1 through July 31. This could eliminate up to 40% of the harassment during nesting and rearing.

32. No construction activities will be allowed during the crucial nesting, denning, or spawning periods for any state threatened fish or wildlife species found along the route during the period designated by the Authorized Officer on a case-by-case basis.

    This should be moderately effective in reducing wildlife losses for such species.

33. Avoid placement of towers in open expanses of water and marsh lands, particularly those utilized as flight lanes, nesting, rearing, or feeding sites by migratory waterfowl and other birds.

    This will mitigate, to an unknown degree wildlife habitat destruction and wildlife displacement.

34. No construction or other activities other than surveying will be conducted through crucial wildlife habitat areas during the period most critical to wildlife species. These determinations will be on a site by site basis by the Authorized Officer. These dates are generally:

    Deer and antelope winter ranges, November 1 - May 31

    Antelope fawning areas, May 15 - June 30

    Sage grouse strutting - nesting, March 1 - June 30

    Raptor nesting and rearing, March 1 - June 30

    Water fowl nesting and rearing, March 1 - August 31

Fisheries production - March 1 - July 31 and/on September - December 31 (spring or fall spawning)

This protection should eliminate up to 1/3 of the human harassment to these species during power line construction.

35. All fences, gates, cattleguards, trailers or other objects or structures that could become inadvertently charged with electricity shall be grounded.

36. Construction activities will not be permitted within 200 feet of any identified springs or seeps.

    This measure would completely protect such water sites for livestock and wildlife use.

37. Grantee will comply with all applicable Federal, State and local laws and regulations concerning use of herbicides to prevent indiscriminate use of poisonous substances and reduce the chance of accidental loss of plant and animal life. Toxic material shall not be released in any lake or water drainage.

    This will completely reduce the risk of damage to vegetation from possible use of herbicides.

38. Corona effects, including noise and electromagnetic induction will be reduced as much as practicable through shielding, grounding, and other safety devices.

    Reduction in the corona effects can be only partially effective and varies with weather conditions.

39. Transportation methods other than motorized ground vehicles will be used for surveillance and maintenance of transmission line facilities to reduce soil erosion and harassment and loss of wildlife, unless approved in writing by the Authorized Officer. Exceptions will be made for major repair jobs upon approval by the Authorized Officer.

    These measures will be effective in reducing wildlife losses and harassment and soil and vegetative losses.

40. The approved route will be monitored by the Grantee, in cooperation with interested Federal and State agencies, for up to five years after completion of construction, as determined by the Authorized Officer, to determine impacts of the powerline on wildlife species.

    This measure will provide data as to impacts of high voltage powerlines on wildlife species.

TABLE IV-1. Key to the mitigating measures which pertain to the soils section and the projected reduction in erosion, which that measure is expected to accomplish.

TABLE IV-1

Mitigation Measure (Number)	Summary of Mitigation Measure	Projected Reduction of Potential Erosion (Tons)
5	Revegetate disturbed areas	25,394
5	Mulch, seed and fertilize	19,750
5	Prevent water concentration	1,400
5	Scarify, rip, and water bar	4,232
5	Repair erosion damage before seeding	1,391
6	Minimal vegetative disturbance	23,983
7	Minimal soil disturbance	7,000
8	Follow BLM logging stipulations	7,001
10	Minimum new road construction	15,530
12	Restrict cross country travel to certain routes	4,232
13	Keep on designated roads and trails	2,875
15	Avoid areas having a high potential for mass movement	7,108
18	Stockpile topsoil	1,431
19	Use helicopter to string sock line	7,054
41	Use other than ground vehicles for maintenance	14,961
	Total	143,341

Total potential soil loss for the proposed route for the life of the project is 213,546.1 tons (Table III-7). Mitigating measures were judged to be 66% effective. Thus the projected reduction of potential erosion is 141,077 tons.

TABLE IV-2. Key to the mitigating measures used for the water resources section and the projected effectiveness of that measure in ac-ft of sediment reduced.

TABLE IV-2

Mitigation Measure (Number)	Summary Mitigation Measure	Projected Reduction of Potential Sedimentation (ac-ft)
5	Revegetate disturbed areas	4.23230
5	Mulch, seed and fertilize	3.87960
5	Scarify, rip and water bar	1.05807
6	Minimal vegetative disturbance	3.52691
7	Minimal soil disturbance	6.34844
8	Follow BLM logging stipulations	4.44758
10	Minimum of new road construction	6.17210
11	Avoid grading road bed whenever possible	2.11615
12	Restrict cross country travel to certain routes	1.12861
13	Keep on designated roads and trails	0.81119
16	Adequate facilities for stream crossings	0.95270
17	Careful removal of temporary stream crossing facilities	1.19915
36	No construction in seeps and springs	0.24688
37	Herbicide regulations	0.35269
	Total	36.47237

Total potential sediment production for the proposed route for the life of the project is 46.05901 acre-feet. Mitigating measures were judged to be 79% effective. Thus the projected reduction of potential sedimentation is 36.47237 acre-feet.

TABLE IV-3

Vegetation Mitigation

IMPACT	MITIGATING MEASURE(S)	MITIGATED IMPACT
1. 579 miles maximum potential construction road causing 983 acres vegetative loss.	10,11,1,29	Reduced to 194 miles of temporary access road causing vegetative loss on 324 acres during construction period.
2. 194 miles of temporary access road during construction period causing vegetative loss on 324 acres.	5,8,10,12,13	Nearly 100% mitigated. All temporary roads rehabilitated. Off-road-vehicle trail remaining causing 65 acres vegetative loss (estimated 20% of 324 acres).
3. Temporary loss of vegetative cover on 45 acres resulting from clearing of towers, footings and pulling pads.	5	45 acres vegetative cover restored after one year.
4. Increased fire hazard.	3	Fire hazard reduced but not entirely eliminated. Non-quantifiable.
5. Risk of damage to vegetation from use of herbicides.	37	100% mitigated.
6. Toxic emissions from transmission line.	38	Reduced but not completely eliminated. Non-quantifiable.
7. Damage to threatened and endangered plant species.	4	Nearly 100% eliminated.

TABLE IV-4

Land Use Mitigation

IMPACT	MITIGATING MEASURES(S)	MITIGATED IMPACT
1. Temporary loss of 843 acres of rangeland producing 101 animal unit months of forage per year.	7,10,11,12 13,14,29	Loss of forage production reduced by 66.4 animal unit months.
2. Permanent loss of 56 animal unit months of forage on 470 acres.	10,11,12, 13,14	Loss of forage reduced by 46 animal unit months.
3. Loss of forage on disturbed areas for six-year period (natural revegetation).	5	Time span for revegetation reduced by four years.
4. Damage to range improvements.	2,21	100% mitigated.
5. Disruption of livestock grazing patterns during construction.	20	Partially mitigated. Non-quantifiable.
6. Increase in man-caused fire hazards.	3	Reduced but not eliminated. Non-quantifiable.
7. Altered forest management practices on timber lands adjacent to right-of-way.	8,9	Abated but not eliminated.
8. Loss of 85 acres of agricultural lands during construction.	7,10,11,12	Loss reduced by 66 acres. 19 acres lost for one-year period.
9. Increased shock hazards in proximity of transmission line.	35,38	
10. Transmission line noise and ozone emissions.	38	Reduced but not completely eliminated. Non-quantifiable.

TABLE IV-5

Wildlife Mitigation

Impacts rated on a relative scale of High, Moderate and Low

IMPACT	MITIGATING MEASURE(S)	MITIGATED IMPACT
1. Additional hunting and harassment of wildlife on 689,280 acres caused by maximum potential access road.	10,11,14, 29,31,34,39	Because of mitigating measures the impact acreage would be reduced by 440,960 acres.
2. Vegetative loss on 324 acres caused by actual construction of 194 miles of temporary access roads.	5,7,10,12,13	Nearly 100% mitigated.
3. Loss of wildlife because of construction and maintenance activities.	1,2,3,34,37	33% reduction.
4. Loss of springs and seeps through compaction or other ground disturbance.	36	High, nearly 100% mitigated.
5. Migrant and resident bird loss due to collisions with towers and conductors.	33	Unquantifiable.
6. Habitat denied to wildlife because of possible corona effects.	38	Moderate to high.
7. Raptor losses due to shooting and other harassment.	10,12,13,14, 24,29,30	Moderate
8. Loss of water quality and fish habitat caused by access road and other construction activities.	5,6,10,16, 17,18	Moderate
9. Loss of threatened or endangered species and their habitat.	31,32	Moderate
10. Loss of 1,322 acres of forest type habitat to wildlife requiring dense timber and snags.	2,8,9	Low

U. S. Forest Service

The following mitigating measures, relating to national forest lands, were provided by the Fremont National Forest, U. S. Forest Service.

Introduction Measures

1. Environmental mitigating measures specified by the U. S. Forest Service are duly provided for by appropriate laws, Executive Orders, United States Code, Code of Federal Regulations, and Secretary of Agriculture Regulations. Amendments and Memorandums. Some applicable measures are the result of the National Environmental Policy Act, others are found in the Code of Federal Regulations involving timber, grazing, wildlife, land uses and the Forest development transportation system. The following references are broad based. Some references will not be pertinent as they refer to procedural alternatives not yet decided upon. Cited references are:

a. Act of June 4, 1897 (30 Stat. 35; 16 U.S.C. 551)
b. Act of February 15, 1901 (31 Stat. 790; 16 U.S.C. 522)
c. Act of February 1, 1905 (33 Stat. 628; 16 U.S.C. 472)
d. Act of June 8, 1906 (34 Stat. 225; 16 U.S.C. 432)
e. Act of March 4, 1911 (36 Stat. 1253 as amended May 27, 1952 (PL 367)
f. Act of July 22, 1937 (50 Stat. 525 as amended 7 U.S.C. 1010-1012)
g. Act of June 12, 1960 (74 Stat. 215; U.S.C. 528-531)
h. Appropriate sections of the following: 36 C.F.R. 212.3, 36 C.F.R. 221, 36 C.F.R. 231, 36 C.F.R. 241, 36 C.F.R. 251
i. Appropriate Secretary's Regulations relating to occupancy and use of National Forest land. These regulations are based on authority granted to the Secretary of Agriculture by Acts of Congress.

j. National Environmental Policy Act of 1969 (PL 91-190)
k. Executive Order 11514
l. Council on Environmental Quality, as published in the Federal Register Vol. 38. No. 147, August 1, 1973, Part II. Act of March 29, 1944 (58 Stat. 132, 16 U.S.C. 583583i)
m. Secretary's Memorandum No. 1695, and Supplements
n. Section 309 Clean Air Act Amendments of 1970
o. National Forest Management Act of 1976

2. The following mitigating measures are general in nature. They are designed to meet the requirements of the Environmental Impact Statement. They form the "Umbrella" under which specific mitigating measures will be developed for National Forest lands in an Environmental Analysis Report. The Environmental Analysis will be prepared after a selection of the corridor has been made through the Environmental Impact Statement procedure.

The specific mitigating measures to be developed in the Environmental Analysis Report will evolve into the final stipulations in the Forest Service Permit.

The Forest Service Environmental Analysis Report will deal with the specific location and kind of actions to be taken on and adjacent to National Forest lands. The mitigating measures which follow in this section are broad in nature and do not pinpoint "what will be done where." Estimated Effectiveness: 80%.

Final Route Location

1. Adjustments in final location will be required on the selection route after the corridor selection has been made through the Environmental Impact Statement procedure. The final location adjustments will be based on a Forest Service Environmental Analysis Report and public input from the EIS hearings.

   This measure will mitigate adverse impacts on specific areas of the route finally selected. Estimated Effectiveness: 80%.

2. Carefully locate the facility to obtain the benefits of compatibility with adjacent utilities, maximum utilization of available space and fewest objections from the general public. The quantity, type and space requirement for future utilities must also be ascertained as nearly as possible.

   This measure is intended to recognize the intrusion of existing facilities which have already degraded certain elements of the environment, to respond to public input and to provide for mitigation of the impacts of similar facilities which may follow in the near future. Estimated Effectiveness: 80%.

3. Optimize the use of dual corridor to minimize impacts.

   This measure would restrict degradation of the environment to specified corridors. Estimated Effectiveness: Variable - depending on route selection.

Bonds and Documents

1. Proponent will furnish the United States a performance bond or other surety acceptable to the Secretary of Agriculture immediately after issuance of the right-of-way permit. The principal amount will be determined prior to issuance. The Bond would at all times be maintained in force and effect in the full principal amount until construction of the line is completed, mitigating measures are accepted and the Bond is released in writing by the Secretary of Agriculture, or as delegated by the Secretary.

The Bond will ensure that the mitigating obligations of the permittee are met under the terms of the grant, provide for payment of obligations which have not been satisfied and ensure the payment, within the amount of said Bond, of any final judgment recovered against proponent for loss or damage to property of others, or for bodily injuries to or the death of any person in any way arising from or connected with the line. These bonding requirements are in addition to, and not intended to affect, all other requirements of law, nor would they be intended to limit in any way proponent's liability under any provision of law. Estimated Effectiveness: 95%.

2. Proponent will furnish the Forest Service a final construction plan for review and approval within 30 days of the issuance of the right-of-way conveyance. The construction plan will include, but will not be limited to, the following items: Right-of-way clearing (including timber harvesting), road location and standards, material sites, assembly areas, tower sites, pulling sites, estimated water needs, and waste areas.

   The construction plan would help prevent damage to sensitive areas by allowing for minor adjustments in alignments, location, work areas, modification of clearing, and tower sites.

   This measure would provide opportunity for the authorized officer to make necessary environmentally beneficial decisions that could not be made based on the detail presented in the existing proposal. Estimated Effectiveness: 80%.

3. Proponent will furnish the Forest Officer in charge a rehabilitation plan for approval within 90 days following the issuance of the right-of-way. This plan will include, but not be limited to, restoration of top soil, reshaping of disturbed sites, obliteration and rehabilitation of roads, location and species of vegetation to be seeded, season of seeding, rate of seeding. The Oregon Interagency Guide for Conservation and Forage Plantings, 1975, would be used as a guide for the basis of species and mix selections. This would allow evaluation of the rehabilitation plan to ensure that areas with rehabilitation potential would have rehabilitation efforts implemented. Estimated Effectiveness: No qualification is possible because of unpredictable geographic variables found along the right-of-way.

4. A fire plan will be furnished by the proponent for approval at least 30 days prior to the start of construction.

   This measure will provide for coordination between the proponent and the Forest Service in both prevention and suppression of fires. It will prevent environmental damage from fire; however, if fire resulting from the proponents activities does occur it will help

lessen adverse effects by providing for strong initial attack by the proponent and concerted action by both parties. Estimated Effectiveness: 20% to 100%.

Engineering and Preconstruction

1. Pre- and post-location conference will be held with the applicant to assure that impacts upon the environment will be minimized. All impacts agreed upon would minimize these impacts.

   The prelocation measure will identify the route sufficiently to identify major areas to avoid. The post-location conference will provide the Forest Service opportunity to identify the surveyed route and discuss problem areas. Estimated Effectiveness: 40%.

2. Provide for the eventual construction of two 500 KV transmission lines in the same corridor as the proposed line. This will require that a total right-of-way width of 320 feet and the construction requirements of two transmission lines be considered in the final alignment and staking procedures.

   This measure assumes that the project generates a corridor, and provides - to a limited extent engineering mitigation for this eventuality. Estimated Effectiveness: 80%.

3. Conduct an archaeological inventory along the selected route and proposed access roads to assure that archaeologically valuable sites are avoided, preserved, or salvaged as required.

   The area traversed by the proposed facility is rich in artifacts and archaeological sites. This measure will provide for identification of such areas. Estimated Effectiveness: 70%. Proponent has so stipulated.

4. Archaeological sites that cannot be avoided will be salvaged under authority of the Uniform Rules and Regulations of the Secretaries of Interior, Agriculture, and Ware pertaining to excavation of archaeological sites.

   Salvage is often a poor alternative for leaving archaeological sites in place. It will provide for preserving moveable antiquities in a museum for enjoyment by the general public and would reduce looting by construction crews. Estimated Effectiveness: 80%.

5. Design long spans and locate towers to avoid impacts on riparian vegetation and farmlands wherever possible.

   This measure will protect water sources, help to avoid slump areas and reduce impacts on water users. Estimated Effectiveness: 90%.

6. Conduct a wildlife inventory along selected route and proposed access roads to provide routing that will avoid nests, dens or areas key to rare, endangered or threatened wildlife species.

   National Forest activities must be geared to provide minimum disturbance to wildlife. Private users of National Forest lands are bound to the same guidelines. Wildlife inventory will identify areas to be avoided. Estimated Effectiveness: 90%.

7. Design major road and highway crossings for minimum visual impact. Cross roads or highways between high points, at a dip, or on a curve in the road to avoid long views of the transmission line where possible. Utilize long spans for road crossings. Utilize natural screening or topographic features for maximum concealment of towers and conductors. Cross major roads at right angles where possible.

   This measure will help negate adverse esthetic impacts along major roads. It will also lessen audio disturbance in vehicle radios. Estimated Effectiveness: 60%.

8. Screen tower sites from view if possible. Locate the line behind ridges, out of view from routes of travel. Where this cannot be accomplished, keep the towers and conductors beneath the skyline, against a backdrop of hills or ridges. Avoid side-hills, narrow ridges, and small hill tops for tower sites.

   These measures are general design concepts which reduce visual impact. Estimated Effectiveness: 60%.

9. Confine the survey centerline to as narrow a clearing as possible and utilize "offsets" to avoid undue damage to standing vegetation.

   One key to mitigating the clearing impacts is to avoid straight line clearing. Estimated Effectiveness: 80%.

<u>Access</u>

1. Use existing access roads to the extent possible. Locate staging areas and tower sites for maximum utilization of existing roads, except where impacts upon the land served by existing roads would be greater than new road construction.

   This measure will reduce new road construction significantly on National Forest Land. Estimated Effectiveness: 60 to 80%, depending on the route alternative selected.

2. All new road locations will be approved in advance by the appropriate agency or landowner. New road locations on the National Forest

lands will be coordinated with National Forest transportation planning to the extent possible. The appropriate zone engineer will coordinate road location with the proponent and the Forest Officer in charge.

This measure will provide opportunity for dual purpose roads, and reduce paralleling facilities. Estimated Effectiveness: 80%.

3. Construction specifications for additional roads will be approved in advance by the Forest Service. Items to be considered will include, but not be limited to: clearing, earthwork, compaction areas where end haul may be required, drainage structures, watercourse, crossings, and temporary or permanent nature of facility to be constructed.

   This measure will ensure that construction methods and results are compatible with the intended use and previously agreed to mitigating measures and keep erosion to a minimum. It will also ensure that culver placement and installation do not increase siltation or impair fish habitat. Estimated Effectiveness: 100%.

4. All additional access roads will be constructed to minimize adverse impacts upon natural beauty and minimize erosion, including following the contour of the land with smooth gradual curves to "fit" the terrain so that excessive cutting and filling is avoided and esthetic values protected.

   This measure will not only reduce cuts and fills but will also provide the opportunity to "roll" guides which in turn facilitates road drainage and culver or drainage dip installation. It will also aid fish passage through culverts on fish supporting streams. Estimated Effectiveness: 40%.

5. Restrict vehicle travel to designated routes thereby eliminating promiscuous cross-country travel. Designed access may include "cross-country" routes specifying either rubber tired or tracked vehicle routes, to be approved by the Forest Officer in charge.

   This measure will effectively reduce new road construction. Estimated Effectiveness: 70%.

6. Retain protective vegetative ground cover on temporary access roads. Where grading is necessary construct roads to a standard that will prevent damage to the soil resource.

   Nongraded roadways are more easily obliterated on a "time will heal" basis if effectively blocked after use. These measures will reduce adverse impacts, the work necessary to correct and cost to cure. Estimated Effectiveness: 50%.

7. Restore temporary roads to productive status by restoring the original contour of the land, draining, revegetating, and closing the road to vehicle use.

This measure mitigates the loss in productivity, reduces the harassment problem to wildlife and alleviates the long-term erosion problems attributable to roads. Estimated Effectiveness: 60%.

8. "Length of Project" access roads will not be constructed. Surveillance of the total route after construction may be accomplished by aircraft or horses. Over the snow vehicles may be used in the winter except in areas restricted in an approved ORV plan because of wildlife harassment potential and other resource/use conflicts. snowmobile surveillance may also be restricted on a year-by-year or season-by-season basis.

Although such access roads aid in maintenance they also encourage vandalism to power line structures, wildlife harassment and attribute to the visual degradation of the project. Much of the proposed project is essentially "across the grain" of the country and length of project roads would be an extremely harsh environmental impact. Project length road systems would not serve any other function in many cases. Estimated Effectiveness: 80%.

9. Construction vehicles and equipment will not be operated on designated or nondesignated routes when inclement weather or other factors cause unacceptable resources or environmental damage, as determined by the Forest Officer in charge.

This measure will protect lands, resources and environment against unforeseen problems and during periods of adverse weather. Estimated Effectiveness: 85%.

10. Sensitive areas within the Fremont National Forest will be identified in the Forest Service Environmental Analysis Report. No road construction will be permitted in areas specifically identified to be left roadless in this document.

This measure will prevent environmental damage from road construction in areas identified as having fragile soils, strong esthetic impacts or major wildlife impacts. Estimated Effectiveness: 95%.

11. Provide seasonal drainage and closure of access roads when necessary to protect the soil during spring runoff.

This measure will protect soil and reduce erosion during the high rise season through the construction period. Estimated Effectiveness: 70%.

12. Forest Service system roads used by the applicant will be subject to cost recovery charges and surface replacement and maintenance charges or performance.

    This measure will ensure that the PP&L pays their fair share of National Forest road investment and pay or perform erosion reducing items of maintenance and surface replacement. Estimated Effectiveness: 95%.

Clearing

1. Clearing and disposal of vegetation, including commercial and non-commercial timber, young growth and shrubs will be as directed by the appropriate agency or land owner. Commercial timber on National Forest lands will be subject to standard R-6 timber sale clauses and stipulations or timber settlement procedures. Timber to be cut shall be so designated by the Forest Service.

    This clause provides for harvesting Forest Service Timber under current timber sale or timber settlement requirements. It provides the owners of adjacent private lands an option as to how their timber is to be removed. It also provides for agency or private land-owner control on noncommercial species and sizes. Estimated Effectiveness: 90%.

2. Restrict vegetative clearing to that necessary to assemble and erect towers, to provide necessary conductor clearance, to remove trees outside the right-of-way which are hazardous to the safe operation of the line, and to provide undulating edge effect to the right-ofway.

    This measure will limit clearing to that necessary for the facility but will alleviate the tunnel effect of power line clearing to some extent. Estimated Effectiveness: 60%.

3. Trees less than 16 feet in height will not be removed from the right-of-way except as necessary for surveying purposes. Trees taller than 16 feet will be left at highway and major forest road crossings and adjacent to natural openings where possible.

    This measure compliments the preceeding measure as a mitigating effect on the visual impacts of the clearing. It also reduces the "shooting gallery" situation for wildlife seeking cover during hunting season. Estimated Effectiveness: 60%.

4. Right-of-way clearing in canyons spanned by the line will be restricted to that actually needed for electrical clearance. Topping may be required in some circumstances.

This measure also mitigates the visual effect often in highly visible areas and in some cases may retain a near total timber producing resource. Estimated Effectiveness: 90%.

5. Utilize the services of a Landscape Architect to feather and undulate clearing lines.

   Modified cutting edges provide a more natural appearance. Straight line right-of-way clearing edges are one of the more obtrusive forms of visual impact. Estimated Effectiveness: 50%.

6. Clear trees and shrubs by hand or helicopter, particularly on steep slopes, rocky areas and near riparian vegetation which cannot be avoided, when it will result in a significant reduction of soil disturbances.

   In many cases as listed, hand or helicopter clearing is cheaper and more effective as well as ecologically less damaging than machine work. Estimated Effectiveness: 90%.

7. Utilize high conductor clearances in forested areas to allow the retention of all but the tallest trees in the right-of-way adjacent to roads and highway.

   This measure will help alleviate the visual impacts in areas of high exposure. Estimated Effectiveness: 70%.

8. Hold clearing and grading of construction sites such as staging areas, pulling sites, tower pads, etc., to the minimum. When grading is required, keep cuts and fills to the minimum required consistent with safety. Provide erosion control measures immediately after construction.

   PP&L has stipulated to a similar clause for staging areas. This measure will reduce visual impacts and help reduce soil losses. Estimated Effectiveness: 70%.

9. Consider measures to improve wildlife habitat when laying out tower site clearings.

   This measure could enhance habitat for small animals and afford some degree of protection to key wildlife browse or feed species.

<u>Construction - Post Construction</u>

1. Preconstruction conferences will be held following issuance of construction contract.

This will ensure guidelines and requirements of land manager are understood and implemented by the applicant. The Forest Service will designate an on-the-ground representative to work with the proponent and his contractors. Estimated Effectiveness: 80%.

2. When permitted, locate construction camps, staging areas and borrow pits in suitable areas designated for such use by the Forest Service or private land owner.

   Proper location of these areas can minimize impacts and effectively reduce "cost to cure." Estimated Effectiveness: 90%.

3. Grantee will make contractors and their employees aware of, and encourage them to abide by "Rules of Conduct" as stated in 36 CFR 261.4 when operating on Federal lands administered by U.S. Forest Service.

   These measures would inform employees and contractors of rules which prohibit destruction of natural features, objects of historic or scientific interest, signs, markers or other public property. Estimated Effectiveness; No way to quantify as this requirement involves human behavior.

4. Grantee will pay the United States full value for all damage to land improvements or other property of the United States caused by grantee or by his employees or contractors.

   Monetary compensation is a poor substitute for resources lost through vandalism or negligence but it does provide some degree of deterrence for such acts. Estimated Effectiveness: 25%.

5. Use techniques for installing tower footings, snubs, and for ground towers that disturb a minimum amount of soil.

   This measure would reduce construction impacts to an acceptable level. PP&L has stipulated to a similar measure. Estimated Effectiveness: 95%.

6. Utilize helicopter construction techniques if necessary to prevent the impact of conventional construction methods and increased access on fragile soils and presently unroaded areas. Track mounted vehicles shall also be considered for some areas in lieu of roads.

   This measure will be implemented on an as needed basis. Specific areas will be identified in the National Forest Environmental Analysis Report. Areas so identified will be selected to minimize or eliminate road construction, and reduce clearing impacts. Estimated Effectiveness: 80%.

7. String the "sock" line by helicopter through or across the Owyhee Mountains, Owyhee River, Warner Valley, all Fremont National Forest areas, Klamath River and other areas as specified by the authorized officers.

   Use of helicopters instead of ground vehicles will reduce centerline clearing in the areas of heavier vegetative growth, and areas of greatest scenic potential. Estimated Effectiveness: 70%.

8. Nonspecular conductors and acid treated galvanized tower steel will be used within National Forest Lands.

   The measures reduce visual impacts caused by reflected light. Nonspecular conductors are less visible than conventional conductors. Treated tower steel takes on a "weathered" look more in keeping with the natural environment. Estimated Effectiveness: 60%.

9. All construction activities be conducted according to the terms of a Fire Plan approved by the respective agencies and land owners.

   This measure ties construction activities to the fire plan. Estimated Effectiveness: 90%.

10. Proponent will not use any water sources on National Forest lands without written permission of the authorized officer.

    This measure would eliminate the problem of unauthorized removal of water that may be needed for livestock and wildlife, or is an adjudicated water right to an individual. Estimated Effectiveness: 100%.

11. Install cattleguards or gates where construction operations intersect and open existing fences. The type and kind of facility would be determined by the Forest Officer in charge.

    This measure would facilitate livestock handling where fence crossings do not now exist. It would prevent trespass of livestock across existing fence boundaries and prevent possible overuse of private lands or range allotments. Estimated Effectiveness: 100%, if facilities were installed immediately.

12. All fences, gates, cattleguards, trailers or other objects or structures that could become inadvertently charged with electricity shall be grounded.

    This measure is a safety precaution to protect Forest Service personnel and users of the National Forests. Estimated Effectiveness: 100%.

13. Dust will be abated on roads at construction sites and on the right-of-way. Water only will be used within the right-of-way, at

staging areas, construction and tensioning sites and on temporary work roads. Dust palitives such as oil, soil cement, etc., may be used on permanent National Forest roads upon approval of the Forest Service.

This measure will reduce dust to opacity levels specified in Fremont Supplement No. 1, 7715 Maintenance Engineering. Estimated Effectiveness: 60%.

14. No gravel will be removed from any stream.

This measure will prevent unnecessary siltation and erosion and will protect fish habitat and spawning areas in fish supporting streams. Estimated Effectiveness: 100%.

15. If grantee requires mineral materials from the National Forest lands, application will be made under applicable regulations for such materials, as required by the U.S. Forest Service and the Mining Enforcement Safety Administration.

This measure would ensure that legal, fiscal and safety requirements are met and would provide for the orderly removal of common materials such as rock or cinders in a safe and environmentally sound manner. Estimated Effectiveness: 100%.

16. National Forest lands used for the right-of-way staging areas, pulling sites and other construction activities will be restored to their natural state insofar as practical, and in accordance with a rehabilitation plan prepared by the proponent and approved by the Forest Service. Rehabilitation measures will include but are not limited to: scarifying or ripping in compacted areas, reshaping, installing and maintenance erosion control structures and seeding, fertilizing and mulching.

These measures are intended to reduce the visual effect of construction activity and hasten the return of productivity to the land. Estimated Effectiveness: 80%.

17. Adequate precautions will be taken to prevent leakage or accidental spillage of any petroleum products, wet concrete or chemicals, in such a location that they will enter any stream, water course or areas of open water.

This measure will protect aquatic plants, insects, fish and humans from harmful substances in water supplies and loss of aquatic habitat. Estimated Effectiveness: 95%.

18. Proponent will install aerial navigation warning balls or discs on line segment as requested by the Federal Aviation Administration. Standards are defined in FAA Advisory Circular 70/7460-1, 2/29/68.

This measure is specifically aimed at safety. Estimated Effectiveness: 98% during daylight hours, variable at night or during inclement weather.

19. Limit the type of vehicles used to transport structures, wire spools, and tensioner equipment to minimize damage along the right-of-way where terrain permits, or helicopter transportation is not required.

    This measure will minimize the gouges and soil disturbance created by inappropriate equipment. Estimated Effectiveness: 70%.

20. Brush piles for wildlife cover may be required to be left within the right-of-way as specified by the Forest Service Environmental Analysis Report.

    This measure may be implemented if necessary to improve habitat for small animals. Estimated Effectiveness: 20%.

21. Short snags and dead or dying trees used by cavity dwelling wildlife will be left within the right-of-way wherever possible.

    This will help avoid the displacement of cavity dwelling wildlife into areas already occupied, or unsuitable to them. Estimated Effectiveness: 30%.

22. Avoid high impact wildlife areas (productive habitat and sensitive vegetative types). Where encroachment is necessary, seed species of grasses, forbs, and browse known to be desirable for the affected species of wildlife. Avoid meadows and riparian bottoms.

    This measure will mitigate adverse impacts on wildlife habitat. Estimated Effectiveness: 70%.

23. Corona effects, including noise, light, ozone and oxide emissions, and electromatic induction will be reduced as much as possible through the proper shielding, size and number of conducting lines, grounding, and other safety defices.

    Corona should be reduced to the fullest extent possible because the effects, particularly upon wildlife, are relatively unknown. Estimated Effectiveness: Unknown.

24. Provide seasonal drainage to disturbed areas within the right-of-way and construction sites when necessary to protect the soil during spring runoff.

    This will reduce erosion during the construction phase of the project during the high risk erosion season. Estimated Effectiveness: 70%.

25. Post-construction conference will be held following a physical inspection of the project.

This measure should assure that the agreements have been completed; and, if not, what can be done to rectify any inconsistencies. Estimated Effectiveness: 95%.

Proponent Proposed Mitigating Measures

In addition to the mitigating measures proposed by the Forest Service, all mitigating measures proposed by Pacific Power and Light Company, under a cover letter dated September 11, 1975, and signed by E.B. Hedberg, Vice President, Pacific Power and Light Company, will be required on National Forest lands. A copy follows.

PACIFIC POWER & LIGHT COMPANY
PUBLIC SERVICE BUILDING
PORTLAND, OREGON 97204

E. B. HEDBERG
VICE PRESIDENT

September 11, 1975

Rec'd 9/11/75

United States Department of the Interior
Bureau of Land Management
Oregon State Office
279 N. E. Oregon Street
Portland, Oregon 97232

Attention: Mr. E. J. Peterson
Associate State Director

Gentlemen:

In response to your oral request for written confirmation of mitigating measures Pacific Power & Light Company has utilized or will implement with respect to the proposed Midpoint-Medford 500 kv transmission line, the attached six-page listing is submitted.

Sincerely,

EBHedberg.

EBH:wg

Attachment

GENERAL MITIGATION MEASURES

Mitigation of possible impacts resulting from Pacific's transmission rights of way generally include the following measures:

1. The line has been designed to minimize visual impacts.

2. No unnecessary disturbance or clearing of vegetation or disturbance of the soil surface will be permitted.

3. Work roads will be water barred to reduce erosion.

4. Drainage patterns of all channels crossed by work roads and the transmission line will be left in their natural state and not straightened, rerouted or obstructed.

5. Culverts will be placed in the work road beds in such a manner that water would flow toward the downstream side so as not to create or accelerate erosion.

6. Drainage ditches placed alongside highways, and access and patrol roads would be placed on the contour and on grade so as to gradually reduce the rate of water flow and deter erosion.

7. A balanced cut and fill procedure would be used in preparing staging areas to reduce erosion and ground disturbance.

8. Archaeological and historical values will be identified and protected prior to construction.

These mitigating measures will be implemented at the substation areas as well as along the right of way. They are intended to minimize environmental disturbance, aesthetic impacts, and land and resource use conflicts.

SPECIFIC MITIGATION MEASURES

Route Selection

The route selection method developed and utilized by Pacific's consultant, VTN-Oregon, is in itself a major mitigating measure. As reported in the Task I Report previously submitted to BLM, this route selection method considers equally five major factors for the objective route selection; ecology, aesthetics, land use, land economics, and engineering. The route selected by this method is economically sound, environmentally responsive, and technically feasible. Moreover, one hundred and fifty-seven miles of the route have been relocated to "best fit" local conditions. The route initially proposed has been relocated (i) west of Lakeview to avoid crossing a major planned recreation development,(ii) across Warner Valley to minimize impact on waterfowl,(iii) near Rome, Oregon to avoid interference with an FAA aircraft navigation system and to reduce the visual impact at the Owyhee River Crossing and (iiii)between the Bruneau Valley and the Snake River to avoid possible interference with military operation of the Saylow Creek Bombing Range and to have less impact on irrigated lands in the area. Within the proposed corridor the route is flexible as it develops through mitigating measures into

the "best fit" for minimum impact. We expect the proposed route to be precisely defined by the end of 1975.

Land and Water Resources

1. Work roads will follow natural contours of the land where possible. This will minimize permanent scarring of the area. While constructing temporary work roads, consideration would be given to restoration required after completion of construction, including reseeding and rock cover. Clearing or grading will be minimized to reduce rehabilitation needs on disturbed areas. These measures would also minimize visual impact of ground disturbance.

2. Vehicular traffic will be limited to approved work roads and construction sites. Only for conductor stringing and other similar activities might it be necessary to perform work off the road system. Limiting vehicular traffic will lessen impact to the soil and ground cover.

3. Parking areas will be arranged to minimize clearing necessary to accommodate parking needs. This measure will reduce acres disturbed.

4. Prevention and control of soil erosion within the right of way and adjacent lands will be of prime importance. The following will help control erosion:

   Work roads will be "put to bed" as soon as practicable.

   Where material is excavated for culvert installations, such loose material will not be placed below the culvert outlet.

   Outlets of all culverts will be properly aligned with the natural stream course and energy dissipators supplied and installed to minimize drainage course disturbance.

   Overside drains will direct water into natural drainage courses.

   Repair of all erosion damage will be accomplished as soon as it occurs to prevent further loss of material into existing drainages.

   All temporary roads and other areas of soil disturbance will be reseeded to establish vegetation.

   Fill slopes will be stabilized by reseeding to establish vegetation.

   Any damage by erosion after completion of site preparation and before application of seed would be repaired.

   Areas of completed construction that are to be stabilized will be stabilized concurrently with the completion of construction.

   In the event hydro-seeding of any area appears to be applicable to this project, this technique will be used.

   Cut slopes will be stabilized.

5. Material from earth slides and other sources that would require removal from the road will neither be deposited in streams or stream channels nor sidecast onto vegetated slopes or other locations where it would erode or cause silt

damage to streams or reservoirs. Locations for deposit of this material will be subject to approval by land owner. These measures would help assure that construction of work roads will not increase suspended sediment in nearby streams, will minimize visual damage and reduce vegetation disturbance.

6. During excavation for tower footings, no benching will be done unless required by unusual footing projections. Excavations will be protected until placement of concrete has been completed. Soil removed from augered holes would be either spread out to conform to the natural contour of the surrounding area or removed. This measure will lessen the impact of top soil removal and reduce destruction or damage of many native plant species.

7. Herbicides, pesticides, or defoliates on the right of way will not be used. These measures will minimize chances of ground or surface water pollution.

8. Care will be taken to minimize damage to trees or shrubs at staging areas. Cuts and fills will be the minimum required, consistent with safe operating practices. The area will be returned as nearly as possible to natural terrain, and erosion control methods will be taken immediately following construction. This will reduce sediment yield and increase the potential for revegetation.

9. All trees and shrubbery that do not need to be cleared or removed during construction will be preserved.

10. No cleared material will be left piled on hillsides, along roadway, or in areas that have not been designated for such purposes. Where required and approved by the agency controlling the area, brush timber and other wood products will be disposed of either by chipping or shredding, and dispersed to serve as mulch, rather than burned. This measure will assist in eliminating unsightly piles of vegetation and subsequent fire hazards. The remaining chips and shreds of vegetation scattered on the ground will help natural revegetation of disturbed areas.

11. Appropriate precautions to avoid starting fires when working in areas of inflammable dry grass, brush, or trees will be taken.

12. During construction of the transmission line in areas where fire hazards exist, all vehicles and gas-powered equipment will be equipped with spark arresters. The Company will establish a project fire plan and all project personnel will be instructed in implementing the plan. These measures should reduce fire hazards along the proposed project, and provide quicker initial fire suppression efforts.

13. Combustible waste material will be transferred away from potential fire hazard sites for appropriate disposal.

Biological Resources

1. Machine clearing near streams will be avoided to the fullest extent possible. This measure will help protect streams and the aquatic flora and fauna from siltation or pollution.

2. Special care to protect the habitat of endangered, rare or protected wildlife will be exercised.

3. Crucial or important wildlife habitat areas will be flagged in the local area where construction occurs. These measures will help alert workmen to significant wildlife and wildlife habitat areas.

4. Selected slash piles for wildlife purposes may be left as designated.

5. Any road closures in effect for wildlife protection or management purposes will be observed.

6. Care will be taken to prevent disturbance or harassment of wildlife, particularly during nesting or breeding periods, by helicopters or other equipment.

7. Eagle nesting platforms will be installed on a number of towers in nesting areas.

8. Personnel involved in the Project will not be permitted to carry firearms.

Social Resources

1. Noise abatement procedures utilized on the site will meet applicable State and Federal laws governing sound control.

2. Noise producing equipment will be located to minimize sound radiation to the surrounding area. If the use of pneumatic tools or equipment near residential properties is necessary, such use will be restricted to daylight hours. Noise abatement measures will help minimize annoyance to visitors at highway rest stops, commercial roadside campgrounds, or recreation areas.

3. The line has been designed to reduce electric and audible noises from the project to acceptable levels. Maximum audible noise levels are predicted to be 47 dB(A) at edge of right of way during worst conditions (i.e. fog, drizzling rain or snow). The transmission line is designed to meet requirements of the National Electric Safety Code.

4. Noise levels in and near residential areas will be kept to a minimum, especially in chipping operations during tree removal or trimming. These measures should minimize noise problems resulting from project construction.

5. Water trucks would be used to control dust where necessary or desirable in the vicinity of neighboring residents or agricultural developments. The use of oil for dust control would require prior approval of the appropriate governing agencies to avoid polluting soil, water, or vegetation. Such dust control will lessen the visual and aesthetic impacts of construction activities on scenic resources and recreation near construction sites.

6. A qualified archaeologist will survey the proposed route before construction to identify any archaeological sites that could be affected by construction of the proposed transmission lines. Such sites will either be excavated or protected and the transmission towers located so they would not affect the site. These measures will minimize losses to the archaeological resource base, and allow for maximum data recovering where loss cannot be avoided.

7. Known historical or archaeological areas would be flagged by a qualified archaeologist prior to start of construction, and all personnel will be instructed to report any finding whether in designated areas or otherwise.

8. Visual impact of work roads on the immediate and surrounding areas will be considered at all times during construction. Trees and brush will be cleared only when necessary to provide electrical clearance, line reliability or suitable access for maintenance and construction. These measures will minimize the aesthetic impact of the work road and right of way.

9. No surface grading, cuts, fills or benching operations will be allowed to affect natural contours unless absolutely necessary. Straight-line clearing for work roads will be avoided wherever possible. These measures are intended to lessen the visual impact of road clearing.

10. Reasonable precautions will be taken to protect, in place, all public land survey monuments, private property corners, and forest boundary markers.

11. Pacific will provide personnel to work closely with representatives of all governing agencies in solving access road problems. These measures should assure minimal soil/vegetation disturbance caused by access road construction.

12. Contact will be made with directly affected local residents and property owners to inform them of the planned project and what may be expected during each construction phase such as the hours of operation and types of construction equipment that would be used in the area.

13. Fully contained sanitation facilities in personnel and material marshaling areas will be installed. Construction personnel will be required to utilize existing sanitary facilities where possible. Portable construction sanitary facilities will be provided if necessary. All waste from temporary sanitary facilities will be transferred in appropriate containers to an approved disposal area. This measure would prevent contamination of water tables and local streams.

14. The transmission line and associated facilities will be maintained to standards of repair and safety criteria acceptable to the applicable regulatory agencies. These measures should help maintain the land in a near original condition excluding permanent improvements that would be installed.

<u>Other Measures</u>

1. Any equipment repair areas, marshaling areas, camps and heliports on federally administered lands will be located at least one-half mile from the nearest residence, business or institutional structures. This measure will reduce impacts on local residents due to night repair operations, noisy equipment assembly practices and the noise of departing and landing helicopters.

2. Pacific will apply water on disturbed areas during construction to provide for dust control as directed by the authorized officer. This measure will reduce dust and resultant visual intrusions caused by construction activities.

3. The authorized officer will be furnished for approval before construction would begin, a construction plan that would include, but not be limited to, road layout, material sites, assembly areas, campsites, tower sites, pulling sites, water resources, and oil and hazardous material spills clean-up plan.

4. Federal Lands used for temporary access roads, campsites, equipment storage, and other construction activities will be restored in accordance with a rehabilitation plan approved by the authorized officer. Whenever revegetation would

be required under the rehabilitation plan, a report will be filed with the authorized officer after the first growing season to assure that revegetation, in fact, was successful. Revegetation efforts will continue until the authorized officer had determined that satisfactory compliance had been made.

5. During rehabilitation efforts, all berms and waste ridges along the edges of the disturbed areas will be removed by spreading the materials over the areas from which they were removed. This includes soils, rock, and vegetative debris.

6. All crane pads, pulling and stringing sites, temporary roads and all other compacted areas will be scarified or ripped on the contour.

   This would reduce compaction, increase infiltration rate and increase the rate of ground cover reestablishment, and therefore allow a more rapid return of flora and fauna.

7. Springs or seeps that are: (1) located within 200 feet of the edge of the right of way; (2) located within 200 feet of any new access road; or (3) located within 200 feet of the boundaries of any marshaling or assembly areas, will be identified. No construction will be permitted within these areas. This measure will greatly reduce the possibility of construction activities altering quality or flow of springs or seeps or the riparian flora and fauna associated with the spring or seep. Construction would be effectively eliminated at these sites.

8. No water sources on Federal Lands will be utilized without written permission of the authorized officer. This measure will eliminate the problem of unauthorized removal of water that may be needed for livestock and wildlife.

9. Within 90 days after conclusion of construction operations, all construction materials and related litter and debris, including vegetative cover accumulated through land clearing, will be disposed of in accordance with instructions of the authorized officer.

10. Following completion of construction, crews will remove all excess materials from the right of way and dispose of all debris in a manner that will return the area as nearly as possible to its pre-construction appearance.

11. After construction, all access roads will be restored to conditions acceptable to private property owners and regulatory agencies. This would include removal of surplus buildings and equipment, lumber, refuse, fencing or any other items not at the site prior to construction. Any drainage deficiencies will be corrected to reduce future erosion. Revegetation of specific areas as required by regulatory agencies will also be performed.

12. All applicable federal, state and local laws and regulations concerning use of pesticides to prevent indiscriminate use of poisonous substances and reduce the chance of accidental loss of plant and animal life will be complied with.

E. B. Hedberg

E. B. Hedberg, Vice President
PACIFIC POWER & LIGHT COMPANY

Date: September 11, 1975

States of Idaho and Oregon

Responses from the states of Idaho and Oregon relative to mitigating measures that they would require follow.

STATE OF IDAHO

DEPARTMENT OF LANDS

STATEHOUSE, BOISE, IDAHO 83720

September 19, 1975

Clair M. Whitlock
Associate State Director
Bureau of Land Management
Room 398, Federal Building
P.O. Box 042
Boise, ID 83724

Dear Mr. Whitlock:

This is in reference to your letter of September 12, 1975 requesting information on the type of permit that would be required by the Department of Lands for the proposed Pacific Power & Light Company's 500 KV powerline from Midpoint Idaho to the Malin Substation in Oregon.

We would require that the power company obtain a permanent easement for this line. Application should be made prior to beginning of construction so that any problems could be cleared up and the final document issued prior to that time. The easement might contain special terms or stipulations to help reduce adverse affects on the lands but they would vary greatly from site to site. We do not have a list of special terms that are included with easements but generally leave this to the discretion of our field personnel. The terms that they include are tailored to the specific easement and depend largely on the situation as it exists on the ground. As I stated to Don Watson of your office today, we cannot be more specific until the actual application for easement is filed.

We hope this will be of some value to you on preparing the Environmental Impact statement and look forward to receiving a copy when it is completed.

Very truly yours,

DIVISION OF LANDS

Winston A. Wiggins

Winston A. Wiggins
Land Specialist

WAW/bv

DIVISION OF STATE LANDS

1445 STATE STREET • SALEM, OREGON • 97310 • Phone 378-3805

September 10, 1975

Mr. Murl Storms
State Director
Bureau of Land Management
P. O. Box 2965
Portland, OR 97208
Attn: Tom O'Kelly

Gentlemen:

For purposes of acknowledging the State of Oregon's requirements in your draft EIS concerning the above, please be advised that ORS 758.010 grants a free right of way across state-owned land to utilities companies. The state agency may impose reasonable requirements for location, construction, and maintenance.

The powerline in question crosses a few parcels of state school lands in Malheur and Harney counties. We believe that the line would conform to the adopted USDA/USDI Scenic and Esthetic Standards for Powerline Construction on these parcels.

The above cannot be interpreted as an assent to the construction of this powerline at this location. The position of the State of Oregon on this question will be arrived at after public hearing and the Division of State Lands will, to the fullest extent possible, conform to that result.

Sincerely,

Leonard G Wilkerson

Leonard G. Wilkerson
Minerals Leasing Specialist

LGW:vw

cc: Burton P. Lewis
Dept. of Energy
Public Utilities Commissioner

CHAPTER V

UNAVOIDABLE ADVERSE IMPACTS

This chapter discusses impacts that would remain despite application of mitigating measures.

CLIMATE

No unavoidable adverse impacts on climate in the project area are expected.

AIR QUALITY

No changes in the existing quality of the air is expected. However, during the construction period short-term adverse impacts would include dust raised by moving equipment and vehicles and exhaust smoke and fumes from construction equipment and vehicles. If right-of-way debris in forested areas should be burned, localized smoke pollution would result on a one-time basis.

GEOLOGY/TOPOGRAPHY

The general geology or topography along the proposed right-of-way would not be affected. Localized, superficial disturbance would be rehabilitated with little or no remaining adverse impacts.

MINERAL RESOURCES

As no mineral resources are known to exist within the proposed right-of-way, no adverse impacts would occur.

SOILS

TABLE V-1 shows the potential soil loss above the base level over a 50-year period after mitigation. For comparison purposes, the first column lists the unmitigated soil loss and the last column lists the unavoidable losses.

Assumptions for these calculations are:

1. That the assumptions listed under soils in Chapter III are valid.

2. That mitigation measures listed in Chapter IV will be effective.

3. That disturbed areas will be effectively revegetated after one year.

4. That no landslides will be initiated.

5. The 36 acres occupied by substations and the Fields reactor station will not produce erosion.

TABLE V-1

POTENTIAL RESIDUAL SOIL LOSS AFTER MITIGATION FOR LIFE OF PROJECT

Net Potential Soil Loss (tons) Without Mitigation 1/	Net Potential Soil Loss (Tons/ac/yr) 2/	Acres Bare After Mitigation Due to Construction	Potential Soil Loss Due to Construction (Tons/yr) 3/	Acres Bare After Mitigation Due to Operation and Maintenance	Potential Soil Loss Due to Operation and Maintenance (Tons/yr) 4/	Total Potential Soil Loss With Mitigation (Tons) 5/
213,546	7.45	405	3,943	101	1,370	70,205

1/ FROM TABLE III-7
2/ NET POTENTIAL SOIL LOSS. Tons per year from totals of last column in TABLE III-3a + 3b + 4a + 4b divided by totals of fourth column from TABLE III-3a + 3b, 4a + 4b.

3/ TONS/ACRE/year times acres
4/ TONS/ACRE/year times acres
5/ POTENTIAL soil loss due to operation and maintenance times 50 years + potential soil loss due to construction.

The 36 acres lost due to construction and expansion of substations and the Fields reactor station cannot be reclaimed.

Ripping does not fully ameliorate the loss of soil pore space due to compaction. There would be some unknown quantity of lost pore space.

Potential soil loss would degrade water quality over the life of the project. The amount of potential sediment is shown in the water resource section of this chapter. Soil loss caused by erosion would reduce productivity a minor unknown amount. Pore space lost because of compaction would reduce the available water holding capacity of the soil which in turn would reduce productivity a minor unknown amount.

WATER RESOURCES

Sedimentation would be the most important residual impact upon water that the proposed action would have. TABLE V-2 shows the potential sediment yield above the base level after mitigation for the life of the project.

Assumptions made for this section are:

1. That the assumptions made in the Soils and Water Resources sections in Chapter III are valid.

2. That mitigation measures listed in Chapter IV will be effective.

3. No landslides will occur.

4. The 36 acres occupied by substations and the Fields reactor station will not produce sediment.

Residual sediment in the water would degrade water quality; the amount of degradation is unknown because site specific information does not exist.

TABLE V-2

POTENTIAL RESIDUAL SEDIMENT YIELD AFTER

MITIGATION FOR LIFE OF PROJECT

Total Potential Sediment Yield Without Mitigation (Ac-Ft)	Total Potential Sedimentation Yield With Mitigation (Ac-Ft)
53.38654	16.91417

NOISE

Audible noise, under adverse conditions, would approach 50 decibels at the edge of the right-of-way, which is within reasonable limits and would meet specified noise level standards as determined by the Mitre Corporation's Report, July, 1975 and the Oregon Department of Environmental Quality, November 4, 1975.

VEGETATION

Construction of the proposed transmission line would disturb some vegetative cover on a temporary basis and operation and maintenance of the project would remove some vegetative cover on a permanent basis.

Permanent loss of vegetation would result on sites occupied by substations and the Fields reactor station (36 acres) and because of anticipated off-road vehicle travel on rehabilitated temporary construction access roads.

Mitigating measures are designed to hold temporary road construction to 194 miles which would temporarily disturb 324 acres. There would be no new permanent access roads, and all temporary roads would be reseeded and "put to bed." However, it is assumed that there would be some permanent loss of vegetative cover due to increased off-the road vehicle travel on the rehabilitated temporary construction access road. This is estimated at 20 percent of the area disturbed by temporary construction roads (20% x 324 acres = 65 acres).

A temporary loss of vegetative cover during the construction period would occur on 45 acres as a result of tower clearing and pulling pads.

Vegetative losses are shown in TABLE V-3.

TABLE V-3

Vegetative Losses

Acres denuded during construction period	Acres rehabilitated after mitigation	Permanent loss of vegetative cover - acres
324 (temp. roads)	259	65
45 (tower sites and pulling pads)	45	0
36 (reactor and substations)	0	36
405	304	101

In addition to the acreage of permanent vegetative removal, an additional 1,310 acres of commercial coniferous forest type would be permanently altered to a non-commercial forest type by removal of tall commercial trees for the right-of-way width where it would pass through the forest type.

Despite all precautions, there would be an unquantifiable increased fire hazard resulting from increased off-road-vehicle use of the area, which could have an effect on the vegetative resource.

WILDLIFE

Summary

The following general wildlife impacts could not be fully mitigated and would be unavoidable:

1. Additional hunting pressure and harassment of wildlife along the right-of-way resulting from off-road-vehicle use.

2. Change of original wildlife species within certain areas due to permanent changes in habitat. (Refer to Chapter IV).

3. Loss of microsite habitats due to permanent loss of vegetative cover caused by off-road-vehicle trail, tower footings and reactor and substations.

4. Loss of habitat to forest dwelling raptors and other wildlife species through removal of tall growing timber, snags, and dead and dying trees in order to keep clear of conductors and towers.

5. Collisions of waterfowl and passerine birds with towers. conductors, and shield wires.

6. Corona effects, especially during periods of inclement weather.

7. Loss of aquatic habitat, fish life and water quality due to accidents such as flash floods in new road and other construction areas, culvert failures, and landslides, especially in mountainous areas.

Unavoidable Impacts

A total of 101 acres of wildlife habitat would be permanently lost through removal of vegetative cover caused by off-road-vehicle use, resulting in a two track trail on the rehabilitated temporary road, and the substations and the Fields reactor station.

As stated in Chapter III, 689,280 acres of wildlife habitat would be adversely affected if an access road should be constructed the entire length

of the power line. Through mitigating measures listed in Chapter IV, actual temporary road construction would be reduced to 194 miles with 248,320 acres, including 22,800 acres of wild horse range, adversely affected (194 miles x 2 mile wide impact zone x 640 acres per square mile).

All temporary roads are to be rehabilitated, seeded and "put to bed." In theory this would eliminate all adverse impacts on wildlife caused by temporary road construction. However, seeding and water barring temporary roads would not stop off-road-vehicle use of them. Such use, if confined to the 194 miles, would still have an adverse impact on the 248,320 acres of wildlife habitat. Furthermore, if off-road-vehicle use occurs on the right-of-way the entire length of the power line, mitigative measures would be voided and the entire 689,280 acres of wildlife habitat would be adversely affected indefinitely.

Revegetation of disturbed sites would not duplicate conditions prior to construction related disturbance of the original vegetation and soil structure. Therefore, wildlife species using such areas would be different from populations previously inhabiting the areas. There is an unknown number of amphibians, reptiles and other wildlife species that could lose their habitat due to vegetative removal on any particular crucial area. Even if most species and sites were identified, some would be lost.

Project construction through known sage grouse strutting grounds and antelope kidding areas could only be partially mitigated by seasonal timing of construction activities. The probability of inadvertent harassment during the crucial time of strutting and kidding could not be avoided, nor could construction through unidentified sites be mitigated. These are unavoidable impacts.

As the use of the right-of-way cannot be prevented, the loss of large raptors by "road hunters" illegally shooting them off towers and other perches appears to be unavoidable. The loss of other wildlife species by overhunting, poaching, and general road hunting would also be unavoidable.

Nearly all of the 1,322 acres of timber land within the proposed right-of-way that would be cut or altered would be lost to wildlife species requiring tall old growth timber and accompanying tall snag trees. Species that could be lost include woodpeckers, the northern spotted owl and other cavity-dwelling species. This forest acreage would be converted and altered to low growing conifers and brush, so cavity-dwelling species would be permanently deprived of such habitat. Numbers are unknown, but the impact would be unavoidable.

Losses of waterfowl, passerine and other birds resulting from collisions with conductors and towers, especially at key migration sites such as the Snake and Bruneau Rivers, Warner Valley and the Klamath Basin, although unknown in number, cannot be mitigated and remain as an unavoidable impact.

Corona effects during bad weather conditions and the corresponding impacts on wildlife, although not fully known, could not be mitigated.

Some damage to fish, fish habitat and riparian vegetation cannot be completely avoided, even if all of the measures in Chapter IV would be implemented. Residual sediment and unexpected landslides could cause damage to fish habitat through siltation, stream blockages and closure of fish access. Some rare, endangered or unique fish species could suffer unmitigated import and/or total loss if their habitat were destroyed or altered.

TABLE V-4

Unavoidable Wildlife Impacts

Unmitigated Impact (Refer to Chapter IV for mitigating measures)	Residual unavoidable impact
1. 101 acres habitat denuded by ORV trail and reactor and substations.	101 acres wildlife habitat permanently lost.
2. 689,280 acres wildlife habitat adversely affected if access road should be constructed entire length of power line.	248,320 acres of wildlife habitat adversely affected.
3. Displacement of species by vegetative changes on right-of-way.	Not quantifiable.
4. Loss of raptors and other wildlife along right-of-way by "road hunting."	Not quantifiable.
5. 1,322 acres of forest type habitat lost to wildlife requiring tall growing timber and snags.	1,322 acres.
6. Loss of waterfowl and passerine birds caused by collision with conductors and towers.	Not quantifiable
7. Habitat denied to wildlife because of corona effects.	Not quantifiable.
8. Loss of fisheries habitat and degradation of water quality.	Not quantifiable

ARCHAEOLOGICAL AND HISTORICAL

Even with full implementation of mitigative measures, damage and destruction would occur to archaeological sites and resources. These sites are unique, non-duplicatable, and are vulnerable to all levels of ground-disturbing activities.

Damage to sites not discovered in survey or construction surveillance would be almost certain to occur. In cases where salvage mitigation is performed the impact would not be fully mitigated as not all possible data can be retrieved. Once excavated, a site is effectively destroyed and removed from future direct research considerations. Salvage is rarely as effective as non-salvage research, partially because of time limitations and personnel levels. Emergency salvage, required by unexpected construction - related discovery would be even less effective.

Archaeological site vandalism impacts resulting from increased public access would be lessened through mitigating measures limiting road-trail development. Any increase in public access, however, would lead to an increased rate of archaeological site vandalism and ultimate site destruction. The extent and degree of archaeological impacts, and consequently the unavoidable adverse impacts, cannot be determined until a detailed inventory of the right-of-way is made.

Visual impacts upon cultural values would be partially lessened through mitigative measures for esthetic values. Unavoidable adverse visual impacts, using a relative scale of High (H), Moderate (M) and Low (L), upon known historic sites are shown in TABLE V-5.

LAND USE

Grazing

There would be an unavoidable loss of range livestock forage on both a temporary and permanent basis. Rehabilitation measures should limit the temporary loss to a two-year period.

TABLE V-6 shows the Animal Unit Months (AUM's) of forage that would be lost.

Permanent losses would result from the areas occupied by the reactor and substations, tower footings and off-road-vehicle trail.

The construction phase could disrupt grazing patterns to a minor extent. This would be for no longer than one grazing season for any given area. Increased fire hazard, particularly during the construction phase, could pose a danger to both forage and livestock, but cannot be quantified.

TABLE V-5

Unavoidable Impacts - Historic Sites

Proposed power line as viewed from	Type of Intrusion	Unmitigated Impact	Unavoidable Impact
Oregon Trail	Trail Crossing	H	H
Three Island State Historical Park	Partial Visibility	M	L
Robertson Cave	Partial Visibility	L	L
Stage Station Site	Partial Visibility	L	L
China Gulch Massacre Site	Partial Visibility	L	L
Oregon Central Military Road	Trail Crossing (2)	H	H
Borax Works	Parial Visibility	L	L
Stage Station Site (2)	Partial Visibility (2)	L	L
Stone Bridge and Oregon Central Military Road	Partial Visibility	H	H

TABLE V-6

UNAVOIDABLE LOSS OF ANIMAL UNIT MONTHS OF FORAGE

	Temporary Loss		Permanent Loss		
	Annual	2 Years	Annual	Project Life (48 yrs.)	Total
Midpoint-Malin	28.5	57.0	6.4	307.2	364.2
Malin-Medford	6.1	12.2	3.6	172.8	185.0
	34.6	69.2	10.0	480.0	549.2

Forestry

Commercial timber production would be lost on 1,322 acres on a permanent basis. Based on site indices and growth potential, this represents an annual loss of 393,000 board feet of timber, or 19,650,000 board feet over the 50-year project life. This loss of commercial timber production would also result in the loss of two man-years of employment in the wood products industry each year, or a total of 100 man-years of employment over the 50-year project life.

There could also be an unquantifiable increase in fire hazard in forested areas caused by increased off-road-vehicle use.

Agriculture

Agricultural production would be lost on 19 acres for a one-year period during the construction phase. After the first year, the loss would amount to 2.8 acres on a permanent basis. This would occur on the area within tower bases (.015 acres per tower) on agricultural lands.

There could also be some unavoidable shock hazards in the use of machinery and metallic irrigation equipment in the near vicinity of the line. Sprinkler irrigation systems may require modification when crossed by the transmission line. The amount of sprinkler irrigated land affected cannot be determined until final route design is completed, but present data indicates it would be very minor.

RESIDENTIAL

Corona discharge produces radio and television interference, varying with receiver distance from the source, and strength and direction of the signal. Mitigation would limit the impact to any residences in the very near vicinity of the line. Overall, the impact would be very small.

SPECIAL USES

The proposed location of the line two to three miles from the Saylor Creek Air Force Range could pose some hazard to low level night time training flights conducted at this facility. Any collision would result in the loss of life and several million dollars in property damage.

The lower Klamath Wildlife Refuge, although about one mile distant, is another special use area that could suffer unavoidable impacts from the proposed route. See the Wildlife section for discussion of unavoidable impacts.

TRANSPORTATION NETWORK

During the construction period, there would be a short-term increased road use caused by the movement of men and materials to and from the job site.

After construction would be completed, there would be no unavoidable adverse impacts on the transportation network throughout the project area as highway use would return to normal.

ESTHETICS AND RECREATION RESOURCES

Due to their interrelated functions and similarities, the unavoidable impacts on both esthetic and recreation resources are combined in the following discussion.

The primary unavoidable esthetic impact of the transmission system would be visual. Regardless of the number of mitigating measures applied, the transmission system would still represent a major intrusion, except in localized areas such as the existing power line between Midpoint and Hagerman, Long Hollow, and the existing 230 KV transmission line west of the Klamath River, into otherwise natural landscapes.

Some skylining and other visual encroachment upon major highways and secondary roads, recreation use and scenic areas such as the Snake River; Malad Gorge State Natural Park; proposed Hagerman Fossil Bed National Monument; Bruneau Sand Dunes State Natural Park; Owyhee Mountains; Owyhee River; Steens Mountain scenic overlooks viewshed; Warner Valley, including the Stone Bridge Site; Warner Mountains, including Camas Prairie and the Warner Ski area; Lower Klamath National Wildlife Refuge and National Historic Landmark; Klamath River and Pacific Crest Trail would be unavoidable.

The careful location of towers and conductors to utilize maximum terrain and vegetative screening, use of nonspecular conductors and treated tower steel, restricted surface disturbance and landscape scarring on canyon slopes, and limited right-of-way clearing would lessen but not eliminate visual impacts.

Unavoidable adverse visual impacts on communities and residences and ranches could occur in Goose Lake Valley, Klamath Basin and in the Antelope Creek area. The use of nonspecular conductors and treated tower steel would reduce but not eliminate the visual impact upon the communities of Lakeview, Malin, Merrrill, Worden and scattered rural residences and ranches.

Unavoidable reductions in sightseeing, nature study, hunting, fishing and other recreation activity quality experience would occur because of the physical presence of the proposed transmission line, regardless of mitigating measures applied.

Unavoidable adverse impacts on potential backcountry, primitive or wilderness study areas would occur from the proposed right-of-way traversing portions of two potential Owyhee Mountains backcountry areas, one potential Oregon high desert roadless study area together with the visual impacts upon the Steens Mountain (east face) and Pueblo

Mountains potential roadless study areas. The primary impact of the transmission system on potential roadless study and backcountry areas would result from the introduction of a major landscape intrusion affecting future studies and decisions regarding backcountry, primitive or wilderness designation and management, together with some reduction in the quality of roadless and backcountry area visitor experience.

An unavoidable impact upon the ultimate Wild and Scenic Rivers Act classification and management of the Owyhee River would result, regardless of the mitigating measures applied, from the river crossing. Locating towers to avoid or minimize skyline visibility, restricting of road and trail development and its attendant landscape scarring on canyon slopes, and the use of nonspecular conductors and treated tower steel would lessen but not eliminate unavoidable visual impacts.

Transmission line construction would result in increased public access, primarily off-road-vehicles, into areas along and adjacent to the right-of-way. Unavoidable adverse impacts would involve increased litter, landscape scarring, archaeological-historical site vandalism, wildlife harassment, reduction in the hunting quality experience and other related recreation use problems and conflicts. Prohibiting new permanent roads and "putting to bed" all temporary roads would reduce but not eliminate off-road-vehicle travel and its attendant increase in recreation use problems and conflicts along and adjacent to the transmission line.

Specific unavoidable adverse impacts are listed in TABLE V-7.

SOCIOECONOMIC CONDITIONS

The adverse economic and social impacts expected as a result of the proposed project offer very limited opportunities for mitigation. Essentially all of the impacts identified in Chapter III are considered as unavoidable impacts that would probably result from construction of the proposed project.

Since practically all of the work force would be living in relatively large cities designated as "permanent headquarters," adverse impacts in these cities would be imperceptible and mitigating measures would not be required. The adverse economic and social impacts resulting from incidental or irregular use of small towns along the proposed route and along commuting routes cannot be effectively mitigated. These impacts, though difficult to quantify are considered unavoidable.

Adverse impacts would probably be limited to the smaller communities - particularly those of 400 persons or less. Incidental use of these small communities would not be expected to foster expansion of facilities or services. A "boom and bust" phenomenon is not expected to occur. Periodic crowding or increased use of retail facilities in some of these small communities is considered unavoidable.

The possibility of a military aircraft collision with the proposed power line still exists, which would entail unquantified social loss and an economic

TABLE V-7

ESTHETICS AND RECREATION IMPACTS

Impacts rated on a relative scale of High (H), Moderate (M) and Low (L)

Proposed Power Line As Viewed From:	Type of Intrusion	Unmitigated Impact	Mitigating Measure(s)	Mitigated Impact
U.S. Highway 30	Highway Crossing	H	9,23,34	M
U.S. Highway 93	Highway Crossing	H	9,23,24	M
Ida St. Highway 25	Highway Crossing	H	9,23,24	M
Ida St. Highway 46	Highway Crossing	H	9,23,24	M
Snake River	River Crossing	H	9,23,29	M
Malad Gorge State Natural Park	Partial Visibility	M	9,23	L
Proposed Hagerman Fossil Beds Nat. Mon.	Partial Visibility	M	9,23	L
Ida St. Highway 51	Highway Crossing	H	9,23,24	M
Bruneau Sand Dunes State Natural Park	Partial Visibility	H	9,23	M
Bruneau Valley	Valley Crossing	M	9,23	L
Pass separating Silver City Range and South Mountain	Owyhee Mtns. Crossing	H	9,19,23,29	H
Boulder Creek	Skyline Visibility	H	9,23,25	M
Jordon Creek	Skyline Visibility	H	9,23,25	M
Owyhee River	River Crossing	H	9,19,23,26,29	M

TABLE V-7 (Cont.)

ESTHETICS AND RECREATION IMPACTS

Impacts rated on a relative scale of High (H), Moderate (M) and Low (L)

Proposed Power Line As Viewed From:	Type of Intrusion	Unmitigated Impact	Mitigating Measure(s)	Mitigated Impact
U.S. Highway 95	Highway Crossing	H	9,23,24	M
Steens Mountain Scenic Overlook	Partial Visibility	M	9,23	L
Stone Bridge	Partial Visibility	H	9,23	H
Warner Valley, Lake Co. Road 310	Valley Crossing	H	9,19,23,24,29	H
Ore. St. Highway 140	Highway Crossing	H	9,19,23,24,29	H
Warner Ski Area	Partial Visibility	M	9,19,24,29	M
Ore. St. Highway 140 Through Warner Mtns.	Skyline Visibility	H	9,19,24,29	M
U.S. Highway 395	Highway Crossing	H	9,23,24	M
Goose Lake Valley	Valley Crossing	M	9,23	L
Ore. St. Highway 140	Highway Crossing	H	9,19,23,29	M
Ore. St. Highway 39	Highway Crossing	H	9,23,24	M
Klamath Basin	Valley Crossing	M	9,23	M
U.S. Highway 97	Highway Crossing	H	9,23,24	M
Klamath River and Canyon Rims	River Crossing	H	9,19,23,27,29	H
Pacific Crest Trail	Trail Crossing	H	9,23,28	M
Ore. St. Highway 66	Highway Crossing	H	9,23,24	H
Antelope Creek	Partial Visibility	M	9,23	L

loss of about $15 million. The loss in the forest products industry, livestock grazing, and farming are considered unavoidable.

The proposed project would alter the values of the lands involved for recreation uses, migratory and resident wildlife, and esthetics. Dependent on point of view, a power line across the relatively undeveloped lands in the vicinity of the Owyhee Mountains, Jordan Creek, the Owyhee River, the Oregon High Desert at the south end of the Steens Mountain, Warner Valley, and Goose Lake Valley would diminish their value. Since these values are largely subjective, they cannot be presently quantified in a meaningful way. In contrast to the adverse impacts of construction activity, these social losses resulting from the presence of the power line would extend for an indefinite period of time and are considered unavoidable impacts.

It appears that while adverse social impacts occur locally, regionally, and nationally, the beneficial impacts appear to be largely local.

The beneficial and adverse impacts on the market area are considered to be generally unavoidable with an increase in availability of electrical energy.

CHAPTER VI

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTVITY

For analysis purposes, short-term is considered the period to construct, implement rehabilitative measures, and place the project in operation. This would be about a three-year period, including a 21-month construction period and one year for rehabilitation of disturbed areas. Long-term is considered to be the life of the project. Although project life is considered to be a 50-year period, it appears logical that any major structure existing for that period of time can be considered permanent for long-term effects.

Construction of the project would introduce new manmade structures (substations), towers, conductors, and a reactor station, and 194 miles of off-road-vehicle trail into sparsely populated, semi-arid remote areas; especially between Little Valley in Idaho and Warner Valley in Oregon.

Long-term use of the various resources such as vegetation, soils, wildlife, esthetics and recreation, etc. would be affected by the project in different ways. Climate, air quality, geology and topography and mineral resources in the project area are expected to remain at the same level during the long-term as presently existing before construction.

SOILS

The short-term loss in soil productivity would be from 1,064 acres being exposed for one year with a potential soil loss of 7,792 tons.

Long-term loss in soil productivity over the life of the project would result from the permanent vegetative cover lost on 65 acres of off-road-vehicle trails and 36 acres occupied by reactor and substations. It is doubtful that these areas would be reclaimed. The potential long-term erosional loss over the life of the project would be 70,205 tons. If not used for project purposes, the soil area involved would continue to produce vegetation for both livestock and wildlife. The tradeoff involved in this longterm loss is unquantifiable with present data.

WATER RESOURCES

The increased short-term sediment load due to erosion for one year would be about 1.94775 acre-feet. The long-term increase in sediment load would be 16.91417 acre-feet. This would be spread over the project life period of 50 years. Sediment would be derived from the 65 acres permanently removed from vegetative production. It is not known what impact this amount of sediment would have on downstream production of fish and aquatic life. It could have a beneficial effect upon agriculture uses downstream. This is also unquantifiable.

VEGETATION

The proposed project would cause both short-term and long-term losses to vegetative cover. During the construction, short-term period 405 acres of

vegetative cover would be out of production for a two-year period. As a result of mitigative measures vegetative cover should be restored on temporarily cleared areas in one year. Past experience with artificial revegetation in the area indicates that this is feasible, with the possible exception of very adverse sites. In two years productivity should equal or exceed pre-project levels on rehabilitated areas.

Vegetation would be permanently removed from 101 acres during the long-term.

WILDLIFE

The short-term construction phase and the long-term project use would decrease the long-term wildlife productivity of the impacted area.

Construction of the transmission line, with its accompanying introduction of off-road-vehicular travel, increased hunting pressure, harassment and possible poaching of wildlife in areas presently relatively remote, would have a long lasting negative impact on wildlife populations within the area traversed by the power line right-of-way.

It is reasonable that, once established, the power line route could become a major east-west corridor with multiple transmission lines. If, in the long-term, a power corridor consisting of several transmission lines should develop, the proposed 175 foot-wide right-of-way could be expanded to a quarter of a mile or more, depending on the number of transmission lines involved. Such a corridor would have to be adequately roaded, resulting in a "highway" through areas of relatively limited access. This would have multiplied effects on wildlife and their habitat.

The alteration of 1,322 acres of forest land from tall growing commercial timber to a maintained low growing height would have long-term effects on wildlife which require such areas for escape cover and especially for bird species which require tall, old growth timber for denning and nesting.

Long-term effects of the transmission line, or multiple lines in the case of a future transmission line corridor, in waterfowl and other migratory bird concentration areas includes potential adverse affects upon migration and feeding patterns and direct losses by collisions with tower, conductors, and shield wires.

Probably the greatest overall long-term effect on the wildlife in the project area would be the "opening up" of 248, 320 acres of formerly remote areas to accelerated human use. This would result, in many cases, in too much hunting pressure, harassment of game, non-game and possibly threatened or endangered species, denying them use of habitat or decreasing or eliminating wildlife populations.

Wildlife populations over the long-term would generally decline in numbers along the proposed route to a new level of stability, but at a generally lower productive rate. Declines in productivity would be immediate upon initiation of construction and continue until a new population equilibrium is reached. An exception to this would be situations in which the habitat of any threatened, presently unknown endangered or unique wildlife would be destroyed. Data to estimate the time required for wildlife production stability and ultimate population levels is not available. However, the total productivity level would generally be lowered.

ARCHAEOLOGICAL AND HISTORICAL

Assessment of the archaeological and historical values involved and dissemination of information obtained would provide immediate gains to scientific knowledge and would provide a data base for future studies. Construction would result in short-term accumulation, through examination of sites to be affected, of additional knowledge concerning past history.

Technological advances have been made in recent times in the archaeological field; future advances in techniques are expected to allow gathering of even more detailed data from sites. Examination, study and excavation of these sites, using current methods, would not produce as much information as preserving them for future study utilizing more advanced research methods and techniques. Uncontrolled loss of values would also occur from increased use and vandalism, removing those sites affected from future research use or damaging them to the extent that research potential would be diminished.

LAND USE

The proposed project would have identifiable effects on long-term land use productivity; detailed below. In addition, it must be recognized that construction of the proposed project would have a definite influence on location of future projects. It is quite likely the proposed right-of-way area could become a multiple project "corridor" in the future, with multiplied effect on long-term productivity. Right-of-way location is a highly significant land use decision on both a short-term and long-term basis.

Grazing

There would be a long-term annual loss of 10 animal unit months of forage on 89 acres of range land permanently cleared.

An additional 237 acres of range land with a carrying capacity of 34.6 animal unit months would be lost for a two-year period. The two-year period would result from the construction and rehabilitation period and the time for revegetation to occur. Revegetation would occur in one year but would not be grazed until the second year after establishment. However, by the third year present productivity should be regained, and with planned rehabilitation should even exceed present levels. The amount cannot be quantified, but a long-term gain in productivity would be expected on rehabilitated range use lands.

Forestry

Commercial timber production would suffer a long-term loss on 1,322 acres of forest land. Annual productivity loss would be 393,000 board feet, which equates to a loss of two man years of employment in the wood products industry.

Agriculture

During construction, 19 acres of agricultural lands would be lost to production for one year. Long-term agricultural production would be diminished by the loss of 2.7 acres of present agricultural lands which would be within

the area occupied by towers along the proposed right-of-way. Future agricultural development could also be diminished on land potentially capable of such development, but the amount cannot be predicted at this time.

Residential

The proposed project would affect a relatively few number of presently established residences. However, in the long-term, the proposed project would preclude intensive residential development under or in the near vicinity of the power line.

Special Uses

In the long-term, the proposed project would preclude certain special uses such as communication sites, airports, and airstrips in the near vicinity.

ESTHETICS

The proposed project would change the nature of the generally underdeveloped recreation and esthetic setting. The physical presence of a transmission line would detract from both the short and long-term "wildland" esthetic and recreation experience. Short-term reduction of the "wildland" recreation experience would occur during the construction phase of the project. Long-term reduction would result from the visual intrusion of the transmission line and the attendant natural landscape scarring, including vegetative clearing. Landscape scarring, although held to a minimum by mitigating measures, must be considered as a long-term effect on esthetic and recreation values.

The long-term "wildland" recreation and esthetic productivity of the proposed right-of-way area would, in all probability, be further reduced through the possible introduction of additional transmission and other utility lines in the future. The proposed right-of-way must potentially be considered to represent a major east-west utility corridor with multiplier long-term recreation and esthetic effects.

The proposed transmission line would provide additional public access, primarily off-road-vehicle, into many areas of limited accessibility along and adjacent to the right-of-way. Increased public access would result in expanded recreation use opportunities, primarily hunting, off-road-vehicle operation and general sightseeing-exploration, for an undeterminable number of future recreation visitors. Increased recreation access and opportunities must be viewed as a trade-off to modification of "wildland" recreation and esthetic productivity.

SOCIOECONOMIC

The evaluation of short and long-term effects, like evaluation of several other economic and social impacts, is largely subjective and is dependent on a person's personal values. The proposed project would create jobs during the construction period. It appears that most of these jobs

would be filled by skilled and semi-skilled employees from outside the region, which would have little impact on local employment. An influx of people into small communities would be expected to create some new jobs for local residents through increased demands for goods and services. Local expenditures would increase, particularly evident in small communities, during the construction period. An increased demand for goods and services, social services, and space in which to live tends to foster economic growth and development and, at the same time, results in some social stress or loss of amentities. These impacts are viewed as short-term since they would be largely confined to the construction period.

Long-term effects are more subjective since they occur in the future and over a longer time period. The revenues generated through taxation would increase funds available for a variety of social needs. This long-term effect on rural areas with low population densities and limited tax bases would be clearly beneficial. Other effects are not as clearcut.

Provision of additional electric power to the market area can be reviewed as both growth responsive or growth inducing, depending on point of view. Similarly, provision of additional power can be viewed as either beneficial or adverse. Dependable power for residential users and available power for commercial and industrial expansion or new industries is beneficial. However, fostering continued economic growth could entail longterm adverse impacts. It is a widely accepted fact that development, growth and economic gains are accompanied by a measure of environmental decay. The degree of environmental decay is dependent on the level of urbanization and industrialization. The point at which continued growth and development results in net economic and social losses rather than gains is nebulous and debatable. It appears that provision of additional power to the market area would be beneficial in the near term and could be adverse in the long-term.

Portions of southwestern Idaho and southeastern Oregon are in a relatively undeveloped and natural state and therefore have unique social values. The high desert is unique, essentially unsettled and remote from major population centers. As the nation continues to grow, the amount of land in a relatively undeveloped state declines. Scarcity and utility create value; as something becomes more and more scarce, value increases. Construction of the power line would decrease the present and long-term social value of a relatively large land area.

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES SHOULD THE PROJECT BE IMPLEMENTED

The proposed project would have a finite life, and theoretically could be terminated and removed at some time in the future. Restoration to pre-project conditions is also theoretically possible. As a practical matter, however, restoration to pre-project conditions is such a remote possibility that certain commitments of resources during the life of the project must be considered as irreversible (incapable of being reversed; once initiated, use would continue) and irretrievable (not recoverable, not retrievable; once used not replaceable). This chapter summarizes, and quantifies where possible, the resource commitments for the entire project to provide a total picture of what implementation of the project would involve.

MINERAL RESOURCES

The major commitment of mineral resources would be 17,871 tons of steel used for towers, 15,939 tons of aluminum and steel used for conductors and shields wires and 782 tons of toughened glass and steel used for insulators. These resources are, for all practical purposes, considered to be irretrievable.

None of the mineral resources would be removed from the project site or impact area.

SOILS

For all practical purposes, the 101 acres to be occupied by facilities and off-road-vehicle trails would be irreversibly lost. Calculated potential soil loss due to construction, operation and maintenance ranges from 2.57 to 88.2 tons per acre per year. This soil would be irretrievably lost from the site; it could not be replaced in its original position.

The undetermined amount of food and fiber which could have grown on the 101 acres would also be irretrievably lost.

ARCHAEOLOGICAL AND HISTORICAL

Implementation of the project would involve an irretrievable commitment of archaeological values to exploration and investigation under current technical procedures. Once excavated and destroyed, these values would not be available for future study using more advanced technological methods.

ESTHETICS AND RECREATION

The esthetic and recreational "wild" character of the project area would be irretrievably impacted through increased human activity associated with the transmission line. Introduction of manmade structures, including towers, conductors, reactor station and trails, would change the basic character of the landscape through much of the proposed route from a natural

semi-wild area to one marked by additional human use and activity. An increased number of trails would cause an increase in human activity, thereby irreversibly changing the general character of the area. Construction of the transmission line would prohibit, or at least limit, establishment of primitive or backcountry areas in the project area. Even if the structures were removed at some future date, the scars of human use would have irreversibly marked the area.

LOSS OF PRODUCTION

There would be a temporary vegetative loss on 405 acres, with a carrying capacity of 34.6 animal unit months of forage, for a one-year period during construction. During the life of the project, permanent vegetative loss would occur on 101 acres, with a carrying capacity of 549 animal unit months for the life of the project. These direct forage losses, for both livestock and wildlife would be irretrievable.

During the construction period, 19 acres of agricultural land would be taken out of production. After implementation of rehabilitative measures, this would be reduced to 2.7 acres and would remain the same during project life. The loss of agricultural production, although unquantifiable, would be an irretrievable loss.

The 1,322 acres of commercial forest timber type that would be altered to a non-commercial type represents an annual irretrievable timber production loss of 393,000 board feet or 19,650,000 board feet over the 50-year project life. The corresponding irretrievable loss of employment in the wood products industry would be two man years each year, or 100 man years over the life of the project.

The alteration of forest type would also result in an irretrievable loss of habitat for an unknown number of raptors, spotted owls and other wildlife species which require tall, old growth timber for denning, nesting and escape cover. The loss of any threatened, endangered or unique wildlife species, including fish species, through habitat alteration or distruction would be irretrievable.

As previously stated, increased hunting pressure, poaching and harassment resulting from increased human access in the project area would affect wildlife use on 248,320 acres of habitat. Wildlife species existing under light hunting and/or harassment pressure would be irretrievably lost if they could not shift to other suitable habitat areas.

An unknown number of waterfowl and other birds could be lost annually because of collisions with conductors and towers. Such annual loss would be expected to continue over the life of the project and would be irretrievable.

If the project is implemented and a utility corridor, consisting of multiple transmission lines, develops in the future, the land occupied would be irreversibly committed to such use. Effects would be multiplied over that of a single transmission line.

SOCIOECONOMIC

As a result of increased available electrical energy some irreversible changes would occur in the market areas, such as increased industry, population, etc. Such changes are occurring at present, and the increment that would be attributable to the proposed project cannot be identified and isolated.

CHAPTER VIII

ALTERNATIVES TO THE PROPOSED PROJECT

INTRODUCTION

This chapter will focus on alternate transmission line routes and different methods of meeting the applicant's project objectives.

ALTERNATE ROUTES - Midpoint to Malin

Four alternate routes were selected for detailed study, analysis and comparison purposes. Alternate route locations shown on Maps A and B in the Appendix of the Draft Statement are general locations.

Description of Alternate Route I

Alternative Route I (FIGURE VIII-1) would be the same as the applicant's proposed route from Midpoint to a point on the bench about 1 mile northwest of the proposed Snake River Crossing near Hagerman. From this point it would parallel an existing 138 KV Idaho Power Company power line northwesterly to a Snake River crossing just east of Glenns Ferry, Idaho. It would continue northwesterly, paralleling existing Idaho Power Co. transmission lines, to a point about 11 miles east of Orchard, Idaho. At that point it would leave the existing corridor and run west, crossing Interstate Highway 80N about six miles east of Orchard, on across the Union Pacific Railroad near Orchard and on west across the Snake River Plains, about 18 miles south of Boise, Idaho. It would cross the Snake River near Walters Ferry, then about two to three miles west of the river it would angle northwesterly along the foothills to a point near Blackjack Butte, about three to four miles southwest of Adrian, Oregon. At this point it would run westerly, crossing the Owyhee River about three to four miles north of Owyhee Dam and reservoir, then southwesterly to near Sourdough Mountain, across the Malheur River and Union Pacific Railroad about three to four miles north of Riverside, and on west crossing just below Warm Springs Dam and reservoir. It would continue on west through the Stinking Water Mountains and cross U.S. Highway 20 about 2 miles southwest of Buchanan and about 18 miles east of Burns, Oregon. After crossing the highway it would follow along the edge of the foothills north of the highway to a point north of Burns, then turn southwest, crossing Highway U.S. 395 and 20 about 12 miles southwest of Burns. It would continue southwesterly, across the southern slope of Wagontire Mountain, cross the Bonneville Power Administration 750 KV D.C. power line in the southern portion of Christmas Lake Valley and on southwesterly crossing between Silver and Summer Lakes to meet two existing 500 KV transmission lines about one mile southeast of Foster Butte. From this point it would parallel the two existing power lines south to the Malin substation.

This alternate route would be about 441.5 miles in length. About 53% of the area that would be crossed are national resource lands administered by the Bureau of Land Management in Idaho and Oregon and about 8% National Forest Lands in Oregon administered by the U.S. Forest Service.

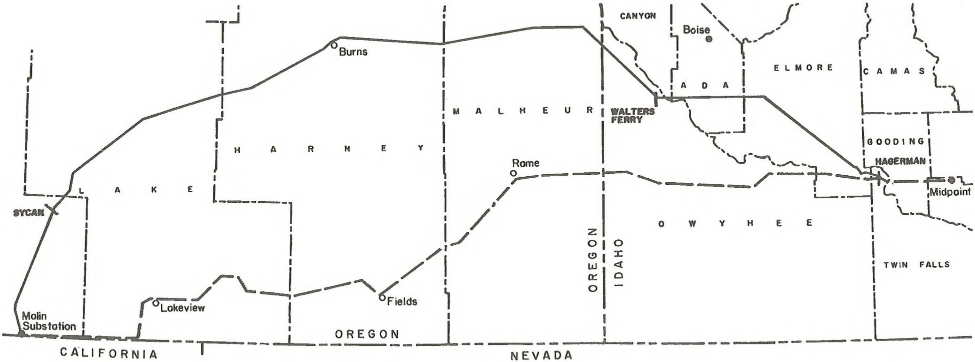


FIGURE VIII-1
Alternate Route I ———
Proposed Route — —

The same expansion of the Midpoint (10 acres) and Malin (9 acres) substations would be required, as well as a reactor station that would occupy about five acres. It would require approximately 1,907 towers which would occupy about 29 acres. Tensioning pads would disturb about three acres and temporary access road construction would disturb about 234 acres. Tower footings would disturb about nine acres.

Description of the Environment - Alternate Route I

CLIMATE AND AIR QUALITY

Climate and air quality is essentially the same as discussed in Chapter II.

GEOLOGY/TOPOGRAPHY

Midpoint to Hagerman

This segment would be the same as the applicant's proposed route.

Hagerman to Walters Ferry

Geology and topography of the area that would be traversed by Alternate Route I is quite varied. There are areas consisting of loess-covered lacustrine sediments on lake terraces which are part of the Payette formation and related strata of Miocene age. Other areas consisting of loess-covered basaltic plains and volcanoes are Snake River basalt of Pliocene to Recent age.

Walters Ferry to Sycan Flat

The eastern segment of the area associated with Alternate Route I is predominantly gently sloping to rolling lava plateau terrain. Elevations are generally between 4,000 and 5,000 feet but range from 2,000 near the Snake River to about 6,000 in the Stinking Water Mountains.

The western portion of Alternate Route I is associated mainly with internal drainage basins. Drainage is internal, into several large closed basins from the surrounding highlands.

Sycan Flat to Malin

The major part of this segment is underlain by Miocene to Recent age lava flows and interbedded tuffaceous sediments. Fault block basins are present throughout the lava plains, and steep escarpments mark fault traces.

The most western portion of the route is a varied terrain of large fault block basins, upthrust dissected highlands and lava tablelands.

MINERAL RESOURCES

No mineral resources were identified along Alternate Route I.

SOILS

Midpoint to Hagerman

This segment would be the same as the applicant's proposed route.

Hagerman to Malin

TABLE VIII-1 describes by route segment the soils that would be crossed by Alternate Route I from Hagerman to Malin.

WATER RESOURCES

Midpoint to Hagerman

This segment would be the same as the applicant's proposed route.

Hagerman to Walters Ferry

The major rivers in the area are the Boise, Payette and Weiser. The annual runoff is probably less than one inch for the south area and up to 30 inches from the Boise River drainage area. Snowpack supplies the principal runoff and is heavy in the higher elevations in the mountains where the annual precipitation may be as high as 80 inches. Much of the lower elevation terrain away from the influence of the mountains may have annual precipitation of about 8 inches with intermittent snow cover. Streamflow from rivers in this area all show a single annual flood peak in April and May as a result of snowmelt. The Boise, Payette and Weiser Rivers are all dilute calcium, magnesium, bicarbonate type water containing less than 100 mg/l dissolved solids. The Boise river basin has had suspended sediment concentrations of 20,700 mg/l during recent floods. Sediment yield ranges from 0.02 to 1.5 acre-feet per square mile per year.

Ground water aquifers over much of the southern portion of the area have not been tested, but small aquifers which yield up to 500 gallons per minute underlie many of the larger streams. Base flow in the headwaters of the Boise, Weiser and Payette Rivers is maintained by ground water discharge from hundreds of small tributaries.

Recharge in the valleys and basins is partly from lateral ground water inflow and precipitation, but is chiefly from irrigation. Other aquifers in this basin may have less than 500 mg/l dissolved solids, with the water hard to very hard, and with sodium and fluorides sometimes excessive. Water from many wells is warm to hot. Ground water is used for irrigation, industry and public supplies.

Walters Ferry to Sycan Flat

The major rivers in the area are the Owyhee, Malheur, Burnt and Powder. The annual runoff is probably less than 1 inch for that area south of the Malheur River and the Wallowa Mountains. Snowpack supplies the principal runoff and is heavy in the higher elevations in the Wallowa Mountains where the annual precipitation may be as high as 80 inches. Much of the lower elevation terrain away from the influence of the mountains may have annual

TABLE VIII-1

SOILS TRAVERSED BY ALTERNATE ROUTE I R-O-W CORRIDOR FROM MIDPOINT, IDAHO TO MALIN, OREGON

Soil Association					Classification					Soil Characteristics					Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or subgroup	Family	Series	Position on Landscape	Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
Hagerman to Walter's Ferry																			
13	2,500-6,000	8-12	100-140	Cropland (cereals, potatoes beans & hay) 80% irrigated	Xerollic Calciorthids	Coarse silty mixed mesic	Portneuf	Lava plains	Loess	Silt loam	Silt loam	None	---	60"+	Moderate	Impervious	Good	High	Erosion; droughtiness
18	4,500-6,500	10-14	60-120	Rangeland Cropland (cereals) dryland	Calcic Argixerolls	Loamy, mixed, mesic		Uplands (lava plains)	Loess & Basic igneous rock	Silt loam	Silt loam	None	---	10-20" over bedrock	Moderate	Impervious	Good	Low	Erosion; shallow bedrock; alkaline subsoil; droughtiness

TABLE VIII-1

SOILS TRAVERSED BY ALTERNATE ROUTE 1 R-O-W CORRIDOR FROM MIDPOINT, IDAHO TO MALIN, ORECON

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Creat Group or subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
28	3,500-7,500	12-15	100-140	Rangeland Cropland (cereals, & hay) some irrigated	Typic Argixerolls	Fine loamy mixed, mesic	Brownlee	Uplands (hills)	Acid igneous rock	Coarse sandy loam	Coarse sandy clay loam	None	---	40-60" over bedrock	Moderately slow	Impervious	Cood	Medium	Erosion, sandy profile
12	2,300-	7-11	120-140	Rangeland Cropland (cereals, alfalfa, & potatoes)-70% irrigated	Xerollic Camborthids	Loamy mixed mesic	Trevino	Uplands (lava plains)	Loess & basic igneous rock	Silt loam	Silt loam	None	---	10-20" over bedrock	Moderate	Impervious	Cood	Low	Erosion, shallow over bedrock, alkaline subsoil, droughtiness
9	2,000-3,000	7-11	120-160	Cropland (cereals, potatoes, sugar beets, beans & hay)-irrigated	Xerollic Haplargids	Fine-silty mixed, mesic	Powder	Terraces	Alluvium	Silt loam	Silt loam	None	---	60"+	Moderate	Moderate	Cood	High	Erosion, alkaline subsoil droughtiness

TABLE VIII-1

SOILS TRAVERSED BY ALTERNATE ROUTE I R-O-W GORRIDOR FROM MIDPOINT, IDAHO TO MALIN, OREGON

Soil Association					Classification			Position on Landscape	Parent Material	Soil Characteristics					Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or subgroup	Family	Series			Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
Walters Ferry to Sycan Flat																			
8	2,000-3,000	7-12	120-165	Rangeland Gropland (cereals, potatoes, sugar beets, beans & hay) irrigated	Typic Haplargids	Fine loamy mixed mesic	Nanyton	Terraces	Alluvium	Gravelly loam	Gravelly clay loam	Gravel	20-35 in profile	60"+	Moderately slow	Moderately slow	Good	Medium	Erosion alkaline gravelly profile droughtiness
21	4,800-5,700	8-16	60-100	Rangeland Cropland (isolated patches of hay-grain-pasture)-irrigated	Ardic Lithic Haploxerolls	Loamy skeletal, mixed, mesic	Bakeoven	Uplands (lava plains nearly level to very steep	Basic igneous rock	Stony loam	Stony Clay loam	Stones cobbles and gravel	20-35 in profile	10-20" over bedrock	Moderately slow	Impervious	Good	Low	Shallow over bedrock stony profile
9	2,000-3,000	7-11	120-160	Cropland (cereals, potatoes, sugar beets beans & hay)- irrigated Rangeland	Xerollic Haplargids	Fine-silty mixed, mesic	Powder	Terraces	Alluvium	Silt loam	Silt loam	None	---	60"+	Moderate	Moderate	Good	High	Erosion alkaline subsoil droughtiness

TABLE VIII-1

SOILS TRAVERSED BY ALTERNATE ROUTE I R-O-W CORRIDOR FROM MIDPOINT, IDAHO TO MALIN, OREGON

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
22	4,800-5,700	8-16	60-100	Rangeland Forest land (scattered)	---	---	Rockland	Uplands (plateaus)	Basalt bedrock	Variable	Variable	Gravel cobbles and stones	0-80 in profile	0-10" over basalt bedrock	---	Impervious	Good	Very low	Shallow over bedrock
14	2,500-3,900	11-15	90-120	Rangeland Cropland (hay & cereals)-irrigated	Typic Argixerolls	Fine, montmorillonitic, mesic	Keating	Uplands, (hills)	Loess & basic igneous rock	Silt loam	Clay loam	None	---	20-40" over bedrock	Moderately slow	Impervious	Good	Low	Erosion mod. deep over bedrock
10	1,000-8,000	8-13	80-120	Rangeland Cropland (irrigated hay & pasture)-limited	Lithic Xerollic Haplargids	Clayey, mixed, mesic	Hart	Uplands (gently sloping (plateaus)	Basic igneous rock	Very stony loam	Clay	Stones	35-80 in top 10"	10-20" over bedrock	Slow	Impervious	Good	Low	Shallow over bedrock stony surface soil
4	4,000-4,400	8-12	90-120	Cropland (pasture & hay)-limited irrigation	Haplargid-Natrargids	Fine-silty, mixed, mesic		Old lake basins,	Lake sediments	Sandy loam to silt loam	Silt loam	None	---	60"+	Moderate	Moderate	Good	High	Alkaline soil

TABLE VIII-1

SOILS TRAVERSED BY ALTERNATE ROUTE I R-O-W CORRIDOR FROM MIDPOINT, IDAHO TO MALIN, OREGON

Soil Association					Classification			Soil Characteristics							Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or subgroup	Family	Series	Position on Landscape	Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
1	4,000-4,400	8-12	90-120	Cropland (hay, pasture & cereals)-85% irrigated Rangeland	Cumulic Haplaquolis	Fine, mixed, noncalcareous, mesic		Flood plains	Alluvium	Silt Loam	Silty clay loam	None	---	60"+	Moderately slow	Moderately slow	Somewhat poor	High	Wetness
Sycan Flat to Malin																			
2c	4,500-5,500	15-18	50-90	Rangeland	Lithic Argixerolls	Clayey, mont., frigid	Merlin	Tablelands	Tuff	Stony loam	Clay	Stone	10	10-20	Slow	Impervious	Well	Very low	Stoniness, shallow depth
2a	4,300-7,000	18-35	30-50	Forest	Cryorthents	Coarse loamy, mixed, cindery	Lapine	Plateau	Ash	Loamy Sand	Coarse Sand	Gravel	30	40-60	Excessive	Excessive	Very rapid	Medium	Erosion droughtiness
3d	4,140-4,325	15-18	50-90	Pasture	Mollic Andaquepts	Ashy frigid	Ck	Bottomland	Ash	Loam	Sandy Loam	Pebble	20	40-60	Moderate	---	Poor	High	Wetness
3a	4,200-6.000	12-16	90-120	Rangeland	Aridic Lithic Argixerolls	Clayey, mont., mesic	Lorella	Uplands	Basalt	Loam	Clayey			10-20	Slow	---	Good	Very low	Stones, droughtiness

TABLE VIII-1

SOILS TRAVERSED BY ALTERNATE ROUTE I R-O-W CORRIDOR FROM MIDPOINT, IDAHO TO MALIN, OREGON

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
3c	4,500-6,500	18-25	50-90	Forest	Pachic Ultic Argixerolls	loamy-skeletal, mixed, frigid	Woodcock	Uplands	Colluvium	Stony loam	Clay loam	Stone	45	40-60	Moderate	---	Well	Moderate	Cold Temp. Erosion
3	4,000-5,500	8-12	90-120	Rangeland Cropland (hay) irrigated	Haplic Durargids	Fine-loamy, mixed, frigid		Fans & Terraces	Alluvium	Gravelly loam	Gravelly loam	Gravel	20-35 in profile	8-20" over silica duripan	moderate	Impervious in duripan	Good	Low	Erosion; shallow over duripan; gravelly profile
7	4,000-5,000	8-10	90-130	Rangeland Cropland (limited pasture)-50% irrigated	Haplic Xerollic Durargids	Fine-loamy, mesic	Flagstaff	Basins & terraces	Lake sediments	Silt Laom	Silty clay laom	None	---	20-40" over hardpan	Moderately slow	Impervious in Hardpan	Somewhat poor	Low & Medium	moderately deep over hardpan alkaline soil

TABLE VIII-1

SOILS TRAVERSED BY ALTERNATE ROUTE I R-O-W CORRIDOR FROM MIDPOINT, IDAHO TO MALIN, OREGON

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
15	4,500-7,000	16-25	40-90	Forest-land Range-land	Xeropsamments	Ashy over loamy & cindery, mixed, frigid	---	Uplands (faulted & dissected plateaus)	Pumice over loamy material	---	---	---	---	20-70" over buried soils	Very rapid	---	Excessive	Medium	Erosion with heavy cover disturdances
2a	4,300-7,000	18-35	30-50	Forest	Cryorthents	Coarse loamy, mixed, cindery	Lapine	Plateau	Ash	Loamy Sand	Coarse Sand	Gravel	30	40-60	Excessive	Excessive	Very rapid	Medium	Erosion droughtiness
2c	4,500-5,500	15-18	50-90	Range-land	Lithic Argixerolls	Clayey, mont., frigid	Merlin	Tablelands	Tuff	Stony loam	Clay	Stone	10	10-20	Slow	Impervious	Well	Very low	Stoniness, shallow depth

precipitation of about 8 inches with intermittent snow cover. Streamflow from rivers in this area all show a single annual flood peak in April and May as a result of snowmelt. The Owyhee and Malheur Rivers are fairly dilute (100-200 mg/l) with calcium bicarbonate mineral in the upper reaches during high flow periods. For the remainder of the year these waters change to a sodium bicarbonate composition.

Sediment yield from the headwaters of the Owyhee and Malheur Rivers is quite low - 0.02 to 0.1 acre-feet/square mile/year. The surface waters are used for irrigation, power and recreation.

Aquifers over much of the area have not been tested, but small aquifers which yield up to 500 gallons per minute underlie many of the larger streams. Base flow in the headwaters of the Malheur River is maintained by ground water discharge from small tributaries.

Recharge in the valleys and basins is from laterial ground water inflow and precipitation.

Ground water from alluvial deposits in the Owyhee basin generally has less than 300 mg/l dissolved solids, mostly calcium magnesium bicarbonate, from non-irrigated areas, and is hard water with no sodium hazard. Irrigated areas generally have less than 500 mg/l dissolved solids with some sodium hazard. Other aquifers in this basin may have less than 500 mg/l dissolved solids, with the water hard to very hard, and with sodium and fluorides sometimes excessive. Water from many wells is warm to hot. Ground water is used for irrigation, industry, and public supplies.

Major streams on the west side of the area show two annual peaks, one in December, and a second in April or May from snowmelt. The east side streams have only one annual peak, in April or May.

The streams have generally high water quality; essentially they are in a natural condition. Sediment yield is believed to be less than 0.1 acre-foot/square mile/year. The nutrient balance together with the hydrologic regimen produces an ideal ecology for biological productivity and bird habitat. The waters are primarily a calcium-magnesium bicarbonate type, low in dissolved solids and hardness.

Sufficient data are not available to quantify the chemistry and sedimentation of most streams and small rivers.

Sycan Flat to Malin

There are two major river systems in this area. The Sprague River drains into Upper Klamath Lake from the east and has a tributary, the Sycan River which drains Sycan Marsh. These rivers, the Sycan and Sprague, show a peak flow in April as a result of snowmelt runoff. Iron concentration in Sprague River valley exceeds the allowable maximum (0.3 ppm) for domestic and municipal uses. Turbidity in the lower reaches of the Sprague River exceeds the 10 JTU limit which is desirable for fish and other aquatic life during the winter months.

The Lost River basin is the principal source of water for over 200,000 cultivated acres. Therefore, the mineral and nutrient constituents from the geologic material and from irrigation return flows increase downstream to cause progressive degradation of water quality. Dissolved oxygen is deficient in the summer in the lower reaches because of low flows, high temperatures, and massive algal blooms. Alkalinity often exceeds levels desirable for aquatic life. The water varies from a calcium-sodium bicarbonate type (probably in the winter high flow period) to a sodium-calcium bicarbonate type (probably in the summer low flow period). Ground water discharge from thermal and alkaline areas is generally too high in total dissolved solids for drinking water or for irrigating sensitive crops. Turbidity has been measured as high as 123 JTU in Lost River in the middle of the basin, well upstream from heavy irrigation use.

NOISE

The area that would be traversed by this alternate route is characterized by small, widely separated communities and sparse settlement. The majority of the lands are in public ownership. They are used primarily for grazing, agriculture, recreation and open space. The ambient noise levels is very near that of nature without man or machines along most of the route.

The ambient noise levels have not been monitored or defined along this alternate route. However, they are presumed to be very close to those given for the proposed route.

VEGETATION

The general vegetative types on this route are the same as described for the proposed route (desert shrub, juniper, grass, coniferous forest, and agricultural). Refer to Chapter II for a detailed discussion of these vegetative types.

Beginning at Midpoint, this route would be the same as the applied for route until reaching Hagerman crossing. Here it would turn northwest and cross alternating areas of desert shrub types and agricultural lands until crossing the Snake River in the Glenns Ferry vicinity. After crossing the river, the route would cross desert shrub types for over 30 miles to a point about 15 miles north of Mountain Home, Idaho. Here it would turn west and continue across a desert shrub type until reaching Highway 80N. West of the highway it would enter agricultural lands and cross them for some nine miles to a point two miles west of Orchard, Idaho. Desert shrub resumes for approximately 20 miles, and then agricultural lands would be crossed for six miles to a point about a mile west of the Snake River near Walters Ferry. The route would turn northwest and roughly parallel the Snake River for approximately 40 miles close to the transition zone between agricultural valley lands and foothill lands with desert shrub vegetation.

Near Blackjack Butte the route would turn west-southwest through desert shrub types and grass types for approximately 50 miles until reaching the vicinity of the Malheur River. Relatively small juniper areas would be traversed in the vicinity of Malheur River, and then desert shrub type resumes near Warm Springs Reservoir and predominate as the route proceeds northwesterly to the Harney Basin area.

Crossing Harney Basin, the route would be close to the transition between agricultural lands (predominately hay crops) of the basin and the desert shrub type of the hill lands north of the basin for about 20 miles. North and slightly east of Burns, Oregon, the route would turn to a southwest direction. The desert shrub types predominate until reaching the vicinity of State Highway 31. Some relatively small juniper and grass (crested wheat grass) type areas would be crossed in this portion. Just west of Highway 31 the elevation rises, and the vegetation grades from desert shrub to juniper and then to coniferous forest in a relatively short distance. Coniferous forest predominates from south of Silver Lake, Oregon, to the Sycan Flat area - a distance of some twenty miles. In the Sycan Flat area the route would cross grass and desert shrub (low sage) types for about eight miles, and then coniferous forest resumes until reaching the Sprague River Valley. It would cross desert shrub, juniper, and a small agricultural area in the Sprague River area; and then the forest type resumes as the route would continue south, passing west of Yainax Butte.

In the Lost River area, the predominant type changes to juniper, and agricultural lands would be crossed for about two miles near Lost River. South of Lost River, the juniper types resume and predominate until the Malin substation would be reached - with some small areas of coniferous forest sites.

Desert shrub is the most common type encountered on the route - comprising 264.5 miles, or almost 60 percent of the route. Agricultural lands are the next most common type, and they comprise about 14 percent of the total route. Grass, coniferous forest, and juniper are of nearly equal occurrence. TABLES VIII-2 and VIII-3 summarize the vegetative data for this alternative.

WILDLIFE

Wildlife along this alternate route are basically the same as listed in Chapter II and will not be duplicated here. Also, the same species regarded as threatened or endangered would be found along this route as were listed for the Applicant's proposed route, except that the Alvord chub and the Warner sucker are not present.

Most of this alternate route is composed of shrublands. There is little change in the vegetative composition over the Applicant's proposed route in the relation and type of wildlife species to vegetative types.

Midpoint to Hagerman

This segment would be the same as the Applicant's proposed route.

Hagerman to Walters Ferry

From near Hagerman, the alternate route would cross the Snake River near Glenns Ferry and then follow an existing power corridor to a point about 11 miles east of Orchard. This route closely parallels the western boundary of the mule deer winter range on the west face of the Danskin Mountains. From near Orchard, the alternate route would turn west and cross the Snake River at Walters Ferry, at the north end of the 31,000 acre Birds of Prey Natural Area, and near the Snake River National Wildlife Refuge. The

TABLE VIII-2

VEGETATIVE TYPE MILES BY ROUTE SEGMENT

ALTERNATE ROUTE 1 - MIDPOINT TO MALIN

Route Segment	Vegetative Type					
	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Total
Midpoint to Hagerman	13.5	5.0	---	7.5	---	26.0
Hagerman to Walters Ferry	76.0	---	---	23.0	---	99.0
Walters Ferry to Sycan Flat	174.0	32.0	17.0	27.5	14.5	265.0
Sycan Flat to Malin	1.0	5.0	20.0	3.0	22.5	51.5
Total Miles	264.5	42.0	37.0	61.0	37.0	441.5

TABLE VIII-3

VEGETATIVE ROUTE MILES - PERCENTAGE OF TOTAL - ACREAGE

ATERNATE ROUTE 1 - MIDPOINT TO MALIN

Type	Miles	Percentage	Acres (175 foot width row)
Desert Shrub	264.5	59.9	5,610
Grass	42	9.5	891
Juniper	37	8.4	785
Agriculture	61	13.8	1,294
Forest	37	8.4	785
Total	441.5	100.0	9,365

Birds of Prey Natural Area constitutes a unique site recently set aside for the preservation of eagles, falcons and other raptors nesting in the cliffs along the Snake River and hunting along the Snake River Plains. It constitutes an extremely important eagle wintering area as well as being a highly important production area. An estimated 6 to 10% of North America's total nesting population of prairie falcons are found on or adjacent to the National Area. The importance of the Snake River as a waterfowl production area and migrational route has been discussed under the "Proposed Route." The crossing at Walters Ferry lies close to the Snake River National Wildlife Refuge, with its many islands offering nesting cover, food and shelter. The U.S. Fish & Wildlife Service lists 172 species of waterfowl and other birds found on Lake Lowell and the general refuge area. Golden eagles have been reported nesting near Walters Ferry.

Walters Ferry to Sycan Flat

From Walters Ferry, this alternate route would run northwest parallel to the Snake River to a point near Adrian, Oregon and then westerly across the Owyhee River, north of Burns, past Wagontire Mountain and Silver Lake to Sycan Flat, west of Summer Lake. This route would pass adjacent to several small wild horse ranges in the Owyhee Mountains.

It would also pass over or adjacent to 11 antelope and six mule deer ranges (see maps A-2 & B-2 of the Draft Statement). One of these--the Stinking Water mule deer herd--contains approximately 4,000 animals (personal communication with Oregon Department of Fish & Wildlife, and BLM personnel at Burns). There are waterfowl along the Owyhee, Malheur, Silvies and Sycan Rivers, in Warm Springs and Moon Reservoirs, in the Silver Lake - Summer Lake area, and at Sycan Marsh. The marshes at Burns along the Silvies River are in close proximity to the large waterfowl concentrations found south of Burns at the Malheur Refuge. This refuge lists over 230 species of birds observed in the refuge area since 1908. Of this total, 91 are waterfowl or shore birds (U.S.D.I., 1973) (12). During the average year, over 130,000 ducks, geese and swans are produced on the Malheur Refuge. In addition, shore birds, passerines, and 78,000 other birds use the refuge annually. The area is also on an important flyway (U.S.F.W., 1969) (11).

Resident fish species found in the Sycan and Sprague Rivers include rainbow trout and sucker or mullett, from Klamath Lake and the Klamath River. Bond (1974) lists the redband trout as "status undetermined" and the Malheur sculpin as a rare species found along this alternate route.

The Malheur River contains rainbow trout, smallmouth bass, bluegill, sunfish, yellow perch, channel catfish, suckers, squawfish, carp, and cottids. There are no anadromous fish in this river.

There are 12 antelope herds along the route containing an estimated population of 1,100 animals. The eight mule deer herds found along the route have a minimum of some 10,000 wintering animals. These major mule

deer concentrations are found in the Stinking Water Mountains, Wagontire Mountain, and Silver Lake areas. Stinking Water and Silver Lake herds receive heavy deer hunting pressure. The last 18 miles of the route would follow an existing 500 KV line from Foster Butte to Sycan Flat. All of this segment is high desert habitat except for the last 15 miles, which is in coniferous forest.

Sycan Flat to Malin

This segment of the alternate route follows two existing 500 KV power lines from Sycan Flat to Malin. This segment is composed principally of timberlands and juniper. It passes through two major deer winter ranges (Gearhart and Goodlow Mountain) containing approximately 6,000 deer.

TABLE VIII-4 is a summary of wildlife distribution found along Alternate Route I, Midpoint to Malin.

ARCHAEOLOGICAL AND HISTORICAL

No archaeological investigations have been made on this alternate route; therefore, no data are available. It is expected that archaeological sites would be found along, or near, most of the water courses, springs, and dry lake beds.

The alternate route segment would generally parallel, and cross in one location, the route of the Oregon Trail between the Snake River near Hagerman and a point midway between Boise and Mountain Home. It would cross the Snake River two to three miles east of the Three Island Crossing State Historical Park and again about two miles south of the site of Walters Ferry, an historical early day river crossing.

LAND USE

This route would traverse land that is primarily open range, undeveloped rural open space, forest, and agricultural characterized by small widely separated communities and sparse population. The most common economic uses along the route are ranching, agriculture, and forestry. Wildlife and recreation are two other common and significant uses which are covered in separate sections of this Chapter.

The majority of the lands that would be crossed by this alternate route are in federal ownership; and the BLM administers the vast majority of these federal lands. However, the U.S. Forest Service is the administrator of nearly all of the federal timber lands found on the route.

The range category includes those lands utilized primarily for grazing of range livestock. It is the most common use along the route, comprising 343.5 route miles and 7,286 acres of the total acres within the alternate right-of-way width. This amounts to almost 78 percent of the right-of-way area.

Alternate Route I, in Idaho, is compatible with Management Framework Plans developed by the Boise, Idaho BLM district. In Oregon, this alternate

TABLE VIII-4

SUMMARY WILDLIFE DISTRIBUTION MIDPOINT TO MALIN

ALTERNATE ROUTE I

Species	Midpoint to Hagerman	Hagerman to Walters Ferry	Walters Ferry to Sycan Flat	Sycan Flat to Malin	Total
Fish	1-	1-	6-	3-	11-
Deer		1-	8-10,000	2-6,000	11-16,000
Antelope	1-100		12- 1,100	1- 50	14- 1,250
Bighorned Sheep					
Elk					
Waterfowl	2	1	1		4
Raptors	1	1	1	1	4
Threatened or Endangered	6Spotted Bat Peregrine Falcon Prairie Falcon W. Ground Snake W. Snowy Plover Bald Eagle	Spotted Bat Peregrine Falcon Prairie Falcon W. Snowy Plover Bald Eagle	Spotted Bat Peregrine Falcon Prairie Falcon W. Snowy Plover Bald Eagle	Peregrine Falcon	
Sagegrouse Strutting Grounds		White Sturgeon	1-		1-
Wild Horses			1- 150		1- 150

Shown by number of concentrations or herds and by estimated population as possible. See actual overlays and maps for details. For example, "4-600" indicates 4 bands of antelope, etc. for a total of 600 individual animals.

route is also compatible with the Management Framework Plan developed by the Vale BLM district. Management Framework Plans have not been completed by the Burns and Lakeview districts for the areas that would be crossed by this alternate route, so no corridors have been identified.

Grazing

Livestock use is based on estimated forage carrying capacity, and productivity varies from high on productive grass sites to very low on some nearly barren desert shrub types. Use is primarily by cattle in the spring to fall period of the year. Based on general averages for various vegetative types, there are an estimated 871 animal unit months (AUM's) of forage within this alternate route.

Forestry

The forestry classification includes lands devoted to commercial timber production. They are found in the south-central Oregon area, from about five miles south of Silver Lake to some 15 miles north of the Malin Substation.

The alternate right-of-way width includes 609 acres of commercial timber lands, about 6-1/2 percent of the total right-of-way area. Nearly all are within the Fremont National Forest. While a relatively small portion of the alternate route, they are of importance to small communities largely dependent on the timber industry (Lakeview, Malin, Bly).

The present volume of commercial timber on these lands is 2,917,000 board feet. The estimated annual growth capacity is 235,000 board feet (U.S.F.S. and BLM data). Ponderosa pine makes up close to 80 percent of this volume, and is the highest value species found. Lodgepole pine and white fir comprise the remainder of the volume.

Agriculture

Agricultural lands within the alternate right-of-way total 61 route miles and 1,294 acres - or about 14 percent of the total right-of-way area. Production is limited primarily to alfalfa or hardy grains, but some row crops are found in the southern Idaho area. Specific areas of concentration along the route are the area north of Hagerman, the Snake River vicinity, the area around Orchard and the vicinity of Glenns Ferry in Idaho; and the Harney Basin area in Oregon. Data is not available as to the breakdown between irrigated and non-irrigated lands, or between crop type acreages and yields. However, the lands are predominantly irrigated. Irrigation is generally by sprinkler system in Idaho and ditch or flood methods in Oregon.

Urban-Suburban-Industrial-Commercial

This alternate route would avoid highly developed urban-suburban-industrial-commercial areas. No urban-surburban areas would be directly traversed or impacted by the route. Following is a tabulation of communitivies within 3 miles of the alternate route:

Community	Proximity
Hagerman, Idaho	2 miles
Glenns Ferry, Idaho	1 mile
Burns, Oregon	2 miles
Bonanza, Oregon	2 miles
Beatty, Oregon	1-1/2 miles

The route also crosses the southern portion of the Christmas Valley "desert" subdivision.

Scattered residential use is found in rural agricultural areas, and very scattered residences in range and forest areas.

Special Use Areas

The following special use areas (as defined in the Land Use section of Chapter II) are in the vicinity of the alternate route.

The Burns, Oregon airport is located approximately 3 miles south.

Communication sites are located on Burns Butte approximately 1 mile south and east of the alternate route.

A radio repeater site on Dead Indian Mountain about 1 mile south of the alternate (south of Silver Lake, Oregon).

ESTHETICS

TABLE VIII-5 summarizes the scenery values and sensitivity classification (see Esthetics, Chapter II for explanation) of the area that would be crossed by Alternate Route I from Midpoint to Malin.

TABLE VIII-5
SCENERY VALUES & SENSITIVITY CLASSIFICATION
ALTERNATE ROUTE I - MIDPOINT TO MALIN

Miles of Right-of-Way	Scenery Value/Sensitivity
2	B1
32	B2
70	B3
205	C2
132.5	C3
Total 441.5	

TABLE VIII-6 provides annual daily traffic data, scenery values and sensitivity classification for areas where Alternate Route I would cross major highways.

TABLE VIII-6
MAJOR HIGHWAY AND ROAD CROSSINGS
ALTERNATE ROUTE I - MIDPOINT TO MALIN

Crossing	Daily Traffic	Scenery Value/Sensitivity
U.S. Highway 93	1,900 A.D.T.	C2
State Highway 46	1,800 A.D.T.	C2
State Highway 25	3,000 A.D.T.	C2
(Interstate 80N)		
U.S. Highway 30	1,100 A.D.T.	B2
U.S. Highway 26 - 30 - 20	4,400 A.D.T.	B2
State Highway 68	900 A.D.T.	C2
Interstate 80N	7,000 A.D.T.	C2
State Highway 45	420 A.D.T.	C2
U.S. Highway 95	770 A.D.T.	C2
U.S. Highway 20	1,000 A.D.T.	C2
U.S. Highway 395	640 A.D.T.	C2
U.S. Highway 20 - 395	900 A.D.T.	C2
U.S. Highway 395	290 A.D.T.	C2
State Highway 31	400 A.D.T.	B2
State Highway 140	960 A.D.T.	C3

TABLE VIII-7 identifies, by county, the number of secondary roads (by county, Forest Service, Bureau of Land Management and other maintained roads) that would be crossed by Alternate Route I.

TABLE VIII-7

SECONDARY ROAD CROSSINGS
ALTERNATE ROUTE I - MIDPOINT TO MALIN

County	Number of Crossings
Gooding	4
Elmore	15
Ada	4
Owyhee	3
Malheur	3
Harney	8
Lake	11
Klamath	9

Midpoint to Hagerman

This segment would be the same as the Applicant's proposed route.

Hagerman to Walters Ferry

Alternate Route I would cross the Snake River Plain, an area characterized by generally level terrain, desert shrub-grass vegetation and overall low scenic qualities resulting from a lack of visual contrasts. The route would cross less than one mile east of the community of Glenns Ferry, about four miles northeast of Mountain Home and 18 miles south of Boise and Nampa, Idaho.

The route segment would parallel several existing electrical transmission lines from Hagerman to a point approximately 25 miles southeast of Boise.

It would cross the Snake River approximately two to three miles east of Three Island State Historical Park, an historic Oregon Trail river crossing. Public use of Three Island State Historical Park was 112,723 visits during 1973. The river crossing is characterized by moderately steep to rolling canyon walls on both the northwest and southeast and a high desert shrub-grassland vegetative type. The Snake River crossing is preceded by existing electrical transmission and utility rights-of-way altering the area's natural landscape appearance.

After crossing the Snake River, the route would extend in a northwesterly direction between Interstate 80N on the west and the Danskin Mountains (Boise Mountains) on the east. The Danskin Mountains form a moderately scenic backdrop for Interstate 80N travelers across the Snake River Plain. It would be situated adjacent to several scattered ranch and farm residences between Interstate 80N and the Danskin Mountains. The route through this area has several existing parallel electrical transmission lines.

The alternate route would cross approximately one mile north of the extreme north boundary of the Bureau of Land Management administered Snake River Birds of Prey Natural Area, a deeply incised, vertical walled river canyon of high visual contrast and scenic quality. Total public use of the Birds of Prey Natural Area was estimated at 5,000 visitor days in 1974.

It would cross the Snake River approximately one and one-half miles upstream of the State Highway 45 crossing at Walters Ferry, the southern boundary of the Snake River National Wildlife Refuge and four miles downstream from the Birds of Prey Natural Area boundary. The river crossing is characterized by level to gently sloping terrain on both the east and west shorelines and a high desert shrub-grassland vegetative type.

The alternate route segment would cross four major transportation routes, 19 secondary routes and one railroad. 1972 annual daily traffic at the four major transportation route crossings was as follows:

U.S. Highway 26 - 30 - 20	4,400 A.D.T.
Idaho State Highway 68	900 A.D.T.
Interstate 80N	7,000 A.D.T.
Idaho State Highway 45	420 A.D.T.

Scenery-Sensitivity factors for the route segment are as follows:

B2	1 mile (Snake River Crossing)
C2	78 miles
C3	20 miles

<u>Walters Ferry to Sycan Flat</u>

After crossing the Snake River near Walters Ferry, the alternate route would extend northwesterly along the edge of the Snake River flood plain and the Owyhee Mountains. The route would cross level to low foothill terrain on the fringe of the agriculture-high desert shrub vegetative type and parallel the Snake River at a distance ranging from one to seven miles. Scenic qualities along this portion of the route segment are generally low resulting from an overall lack of visual contrasts. The route segment would be situated five miles southwest of the communities of Homedale and Marsing, Idaho and generally parallel to several major and secondary transportation routes adjacent to the Snake River. It would cross one mile northeast of a U.S. Highway 95 overlook providing a view of the Snake River and the historic McKenzie campsite. The State Highway 95 overlook includes an Idaho Highway Department and State Historical Society sign concerning the Donald McKenzie expedition and the origin of the name "Owyhee."

Extending westerly, the route would cross the Owyhee River approximately three to four miles downstream from Owyhee Dam, which forms the 30+ mile Lake Owyhee. The route crossing is characterized by moderately steep sloping and broken canyon walls rising 200 - 300 feet above the river, and a high desert shrub vegetative type. Visual contrasts created by the Owyhee River and the adjacent canyon slopes result in moderate scenic values. The route would cross the graded access road, situated within the canyon bottom, leading to Owyhee Dam and Lake Owyhee. Lake Owyhee, including Lake Owyhee State Park, received an estimated 163,135 visitor days of recreation use in 1974.

Extending westerly from the Owyhee River, the route segment would extend across approximately 50 miles of level to broken terrain and high desert shrub-grassland vegetation, generally characterized by a lack of visual contrasts and low scenic values, before crossing the Malheur River and the Stinking Water Mountains. The Malheur River crossing is characterized by moderately steep and rolling canyon slopes, high desert-shrub vegetation and generally low visual contrasts and scenic values. The Union Pacific Railroad extends through the Malheur River canyon and detracts from the area's natural landscape appearance. The Stinking Water Mountains (FIGURE VIII-2) are characterized by rolling to broken mountainous terrain and a scattered juniper-desert shrub-grassland vegetative type. The Stinking Water Mountains, a portion of which offer moderate visual contrasts and scenic values, receive moderate to heavy deer hunting activity. The route segment, in the area of the Stinking Water Mountains, would cross immediately south of Warm Springs Reservoir, a Malheur River water impoundment with a maximum surface area of 3,000+ acres. Warm Springs Reservoir receives moderate to heavy fishing pressure. The route would cross the proposed location of the High Desert Trail as it extends in a north-south direction through the Stinking Water Mountains. That portion of the route segment from the Owyhee River west through the Stinking Water Mountains, with the exception of secondary roads, the Union Pacific Railroad and Warm Springs Reservoir, is basically free of major manmade landscape intrusions.

Extending west of the Stinking Water Mountains, the route would cross the northern extremity of Harney Basin on the fringe of the juniper - irrigated and dry farm pastureland area. It would parallel U.S. Highway 20 on the north for approximately 18 miles, at a distance of from one and one-half to one-half mile, through the area.

The alternate route would cross about two miles north of the communities of Burns and Hines as it would extend across level to rolling terrain characterized by scattered juniper - high desert vegetation. It would cross adjacent to several ranch and farm residences through the northern Harney Basin area.

Extending westerly from the communities of Burns and Hines, the route segment would extend across approximately 40 miles of level to rolling terrain and high desert shrub-grassland vegetation, generally characterized by a lack of visual contrasts and low scenic values, before crossing Wagontire Mountain. It would cross within six and one-half miles of the extreme northwest corner of Malheur National Wildlife Refuge, which received 38,214

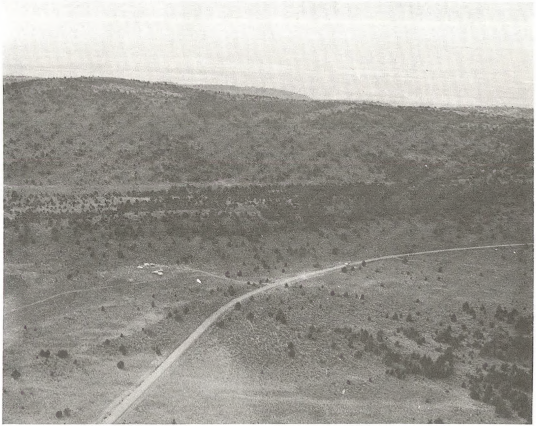


FIGURE VIII-2

STINKING WATER MOUNTAINS

(east of Burns, Oregon)

visits in 1973. The route segment would cross Moon Reservoir, a low scenic value regulatory reservoir, which receives minimum public use. That portion of the route segment from the communities of Burns and Hines west to Wagontire Mountain, with the exception of major highways and secondary road crossings and Moon Reservoir, is basically free of major manmade landscape intrusions.

The route would cross the southern portion of Wagontire Mountain, a rolling to moderately steep and broken mountainous area characterized as a juniper-grassland vegetative type. Wagontire Mountain, which is of moderate scenic value, receives heavy deer hunting activity during the fall months. It would cross adjacent to several ranch residences on the east side of Wagontire Mountain.

Extending westerly of Wagontire Mountain, the route segment would continue across approximately 50 miles of level to rolling and broken terrain and high desert shrub-grassland vegetation, generally characterized by a lack of visual contrasts and low scenic values. It would cross about five to six miles south of the Bureau of Land Management administered Lost Forest Research Natural Area and the adjacent Christmas Lake Valley Sand Dunes. This portion of the route segment, with the exception of secondary roads, is basically free of major manmade landscape intrusions.

The segment would cross State Highway 31 near Picture Rock Pass (FIGURE VIII-3) before entering the Fremont National Forest at the northern topographical break of Winter Ridge, a major landscape escarpment of high scenic value. The route across National Forest lands would be characterized by moderately steep sloping to level and rolling terrain and a mixed conifer vegetative type with relatively large and intermingled clearings and open areas. After entering the National Forest, the segment would cross approximately 10 miles of moderately scenic forest lands, basically free of major manmade landscape intrusions, before connecting with two existing 500 KV transmission lines near Foster Butte. It would cross Sycan Flat, an open meadow area, on the east side of Sycan Marsh, an area receiving light waterfowl hunting activity. The route would be situated six miles east of Thompson Reservoir and two U.S. Forest Service developed recreation sites. The alternate route segment area within Fremont National Forest receives moderate to heavy deer hunting activity. The route segment across National Forest lands would parallel two existing Bonneville Power Administration-Portland General Electric 500 KV transmission lines, which are highly visible because of landscape contrasts resulting from complete right-of-way clearing of forest vegetation and maintenance road development.

The alternate route segment would cross six major transportation routes with annual daily traffic as follows:

U.S. Highway 95	770 A.D.T.
U.S. Highway 20	1,000 A.D.T.
U.S. Highway 395	640 A.D.T.
U.S. Highway 20 - 395	900 A.D.T.
U.S. Highway 395	290 A.D.T.
Oregon State Highway 31	400 A.D.T.

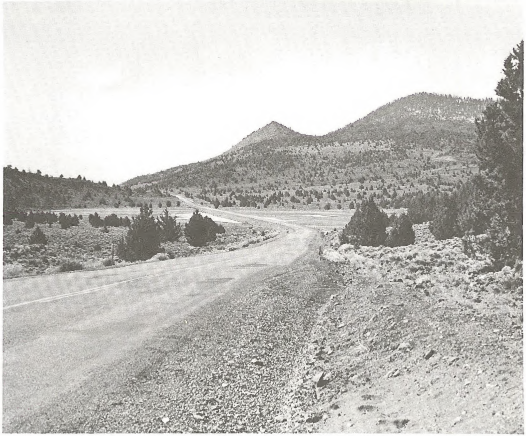


FIGURE VIII-3

ORE. STATE HIGHWAY 31 NEAR PICTURE ROCK PASS

Route segment crosses 25 secondary transportation routes including 14 county roads, 10 U.S. Forest Service roads and the Bureau of Land Management's Stinking Water Mountains access road.

Scenery-sensitivity factors for the route segment are as follows:

B1	2 miles (Owyhee River Crossing)
B2	30 miles
B3	43 miles
C2	103 miles
C3	37 miles

Sycan Flat to Malin

Alternate Route I would continue to parallel the two existing 500 KV transmission lines from Sycan Flat to the Malin substation. Through timbered areas the existing right-of-way is highly visible because of complete clearing of forest vegetation (FIGURE VIII-4). The alternate route would cross two separate National Forest areas. Through this area, terrain ranges from rolling mountains with a mixed conifer vegetative type to the level or gently sloping terrain with scattered juniper-irrigated pastureland of the Sprague River and Langell Valleys. The route would pass less than two miles east of the community of Bonanza in the Langell Valley. The alternate route segment receives moderate to heavy deer hunting pressure in the higher elevation areas, including the Black Hills, Yainax Butte and Bryant Mountain areas, and moderate waterfowl hunting in the Sprague River and Langell Valley areas.

The route segment would cross one major transportation route and eight secondary roads, including two Forest Service roads. Annual daily traffic during 1973 at the major transportation route crossing was as follows:

Oregon State Highway 140	960 A.D.T.

Scenery-sensitivity factors for the route segment are as follows:

B3	27 miles
C3	24.5 miles

RECREATION RESOURCES

Midpoint to Hagerman

This alternate route segment is the same as the applicant's proposed route.

Hagerman to Walters Ferry

Primary recreation activities and opportunities along this route segment include fishing, boating, waterfowl hunting-observation at the Snake River crossings, sightseeing, nature study and photography at the Snake River Birds of Prey Natural Area together with general sightseeing, small game hunting and off-road vehicle operation along the overall route segment.

FIGURE VIII-4

EXIS[illegible]NG TWO 500Kv TRANSMISSION LINES

(south of Sycan Flat)

The segment would cross the Snake River two to three miles east of Three Island State Historical Park, about one mile north of the extreme north boundary of the Birds of Prey Natural Area and would cross the Snake River a second time one and one-half miles south of the south boundary of the Snake River National Wildlife Refuge.

Walters Ferry to Sycan Flat

Primary recreation activities and opportunities along this alternate route segment include deer and small game hunting in the Stinking Water Mountains, Wagontire Mountain and the National Forest areas; camping, fishing, boating and related water-oriented activities at Owyhee and Warm Springs Reservoirs; migratory waterfowl hunting-observation in the Harney Basin area. Sightseeing, nature study and photography are important activities at the Lost Forest Research Natural Area, dune buggy operation and sightseeing at Christmas Lake Valley Sand Dunes, together with general sightseeing, small game hunting and off-road vehicle operation along the overall route segment.

The route segment would pass within one mile of a U.S. Highway 95 overlook of the Snake River, within five miles of Owyhee Dam and Reservoir, within less than one mile of Warm Springs Reservoir, five to six miles south of the Lost Forest Research Natural Area and Christmas Lake Valley sand dunes, and within six miles of developed recreation facilities at Thompson Reservoir in the Fremont National Forest.

Sycan Flat to Malin

Primary recreation activities and opportunities along this alternate route segment include deer hunting in Black Hills, Yainax Butte and Bryant Mountain areas; migratory waterfowl hunting in the Sprague River and Langell Valley areas together with general sightseeing and small game hunting along the remainder of the route segment.

SOCIOECONOMIC CONDITIONS

The socioeconomic environment described in Chapter II included a description of the seven Idaho and four Oregon counties potentially affected or traversed by the proposed project. Since most of the information has been compiled and published on a county basis, the description of the social and economic environment was done on a county-wide basis. Therefore, the socioeconomic environment of Alternate Route I would be the same as that for the proposed route described in Chapter II.

Analysis of Impacts - Alternate Route I

GENERAL

Chapter IV mitigating measures would apply to Alternate Route I.

Impacts upon the environment, that would result if Alternate Route I should be constructed, upon climate, air quality, geology/topography, minerals and noise would be about the same as those described in Chapter

TABLE VIII- 10

POTENTIAL RESIDUAL SOIL LOSS

ALTERNATE ROUTE I - MIDPOINT TO MALIN

Route Segment	Net Potential Soil Loss (Tons) 1/
Midpoint to Hagerman	853
Hagerman to Walters Ferry	1972
Walters Ferry to Sycan Flat	10,042
Sycan Flat to Malin	1156
Total	14,023

1/ The net potential loss is the erosion which takes place above the base level in the one year the soil is essentially bare plus 50 times the annual loss due to operation and maintenance. This is the unavoidable impact over the life of the project.

TABLE VIII-11

EXISTING SEDIMENT YIELD/CALCULATED INCREASE

ALTERNATE ROUTE I - MIDPOINT TO MALIN

Route Segment	Total Potential Sediment Yield From Acres Affected by Proposed Action Over 50 Years (Ac-Ft)
Midpoint to Hagerman	0.21325
Hagerman to Walters Ferry	0.49300
Walters Ferry to Sycan Flat	2.51050
Sycan Flat to Malin	0.28900
Total	3.50575

TABLE VIII-12

TEMPORARY LOSS OF VEGETATIVE COVER (ONE YEAR) - CONSTRUCTION PERIOD

ALTERNATE ROUTE I - MIDPOINT TO MALIN

	Acres Lost by Vegetative Type					
Route Segment	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Total
Midpoint to Hagerman	16	2	---	2	---	20
Hagerman to Walters Ferry	36	--	---	10	---	46
Walters Ferry to Sycan Flat	141	13	12	10	21	197
Sycan Flat to Malin	1	2	19	2	12	36
Total	194	17	31	24	33	299

Cause	Acres
Roads	234
Tower Clearing	29
Tower Footings	9
Tensioning Pads	3
Reactor Station	5
Midpoint Substation	10
Malin Substation	9
Total	299

TABLE VIII-13

PERMANENT LOSS OF VEGETATIVE COVER - OPERATION & MAINTENANCE

ALTERNATE ROUTE I - MIDPOINT TO MALIN

	Vegetative Type					
Route Segment	Desert Shrub	Grass	Juniper	Agri- culture	Forest	Total
Midpoint to Hagerman	11	--	--	--	--	11
Hagerman to Walters Ferry	6	--	--	--	--	6
Walters Ferry to Sycan Flat	29	2	2	--	4	37
Sycan Flat to Malin	--	--	11	--	2	13
Total	46	2	13	--	6	67

Cause	Acres
ORV Travel	43
Reactor Station	5
Midpoint Substation	10
Malin Substation	9
Total	67

In the coniferous forest type, this alternate route would parallel two existing 500 KV lines for about 26 miles, nearly entirely within the National Forest. The Forest Service would require the alternate route to be immediately adjacent to the existing lines. By so doing, the width of a new right-of-way would be reduced to 145 feet, rather than 175 feet. The total acreage of coniferous forest within the 145 foot width is 646 acres, of which 609 acres are commercial forest type. Of the 609 acres of commercial forest, six acres would be permanently lost to vegetative production. The remaining 603 acres would be altered to a non-commercial forest type by permanent removal of tall growing coniferous species for the entire right-of-way width. The present volume of commercial timber that would be removed amounts to 2,917,000 board feet. The growth potential is 235,000 board feet annually, or a loss of 11,750,000 board feet over a project life of 50 years.

Unavoidable increase in fire hazard would be unquantifiable.

WILDLIFE

Impacts on wildlife populations and habitat would be similar to those discussed in Chapter III for the applicant's proposed route.

Temporary impacts on raptors nesting and hunting in the area between the Birds of Prey Natural Area and the Snake River National Wildlife Refuge would occur as a result of disturbance caused by humans and equipment during the construction phase. Following construction there could be raptor losses through collisions with conductors and power line access roads could disturb nesting raptors (USFWS, 1976). The Snake River area near Walters Ferry is a major waterfowl flyway in Idaho. The adverse impacts on waterfowl, shore birds and passerine birds caused by probable collisions with towers and conductors would also exist. Because of the proximity of the route to major waterfowl flyways and use areas in the Harvey Basin, possible collision losses and adverse impacts from corona are believed to be significant (USFWS, 1976). Any collision losses over the life of the project to waterflowl concentrations along the Snake River and in the Harvey Basin would be unmitigated and unavoidable.

A total of 224 recorded species of migratory birds are found in the Harvey Basin. Included are nesting and staging populations of the greater sand hill crane and nesting populations of long-billed curlews, among plovers, glossy ibis and golden eagles (USFWS, 1976).

The alternate route also crosses three major waterfowl feeding flight paths; Silver Creek, Silvies River north of Burns, and the valley area between Burns and Buchanan (USFS, 1976).

The additional hunting pressure and harassment caused by off-road-vehicle-use along the alternate power line route would have a direct effect on about 6,000 deer and 800 antelope. Harassment of wild horses could also occur.

The permanent loss of six acres of commercial forest type and alteration of 603 acres would have an unavoidable impact on an undetermined number of birds which require old growth timber, snags and dead trees for denning and nesting.

TABLE VIII-14 shows unavoidable adverse impacts, after mitigating measures would be applied, that could be caused by Alternate Route I.

ARCHAEOLOGICAL AND HISTORICAL VALUES

Alternate Route I would have corresponding impacts on archaeological sites and values as the applicant's proposed route would. Detailed cultural surveys, as required for the proposed route, would provide additional site specific information regarding values, impacts and mitigation requirements.

Oregon Trail visual impacts are already reduced by the presence of existing parallel power lines from the Snake River northward to near Orchard, Idaho, which detract from the Trail's overall historical setting. The addition of one more, larger, power line would increase the affect, to an unknown degree.

TABLE VIII - 14

UNAVOIDABLE ADVERSE IMPACTS ON WILDLIFE HABITAT

Alternate Route 1 - Midpoint to Malin

	Deer Winter Range Acres			Antelope Range Acres			Wild Horse Range Acres			(6) Forest Wildlife		(7) Waterfowl By No. of Sites		(8) Raptors By No. of Sites	New Access into Remote Areas	
Route Segment	(1) Miles	(2) Direct	(3) Indirect	Miles	Direct	Indirect	Miles	Direct	In-direct	Miles	Acres Affected	Direct	In-direct	Direct	Miles	(3) Acres
Midpoint to Hagerman	0	0	0	18	3.6	23,000	0	0	0	0	0	1	1	1	0	0
Hagerman to Walter's Ferry	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0
Walter's Ferry to Sycan Flat	54	10.8	69,100	42	8.4	53,800	2	4	1300	14.5	308	0	3	0	0	25,600
Sycan Flat to Malin	15	1.0	(5) 0	0	0	0	0	0	0	22.5	447	0	0	0	0	0
TOTALS	69	11,8	69,100	60	12.0	76,800	2	4	1300	37.0	785	3	4	4	20	25,600

(1) Estimated miles of power line right of way passing through crucial big game or wild horse habitat.
(2) Based on .2 areas of vegetation permanently removed per mile of power line by O.R.V. Trail.
(3) Based on effect of vehicles and people on animals for 1 mile on each side of trail (lineal milage X 2 X 640 acres per sq. mile).
(4) 12 miles of Snake River Birds of Prey natural area affected.
(5) Adjacent to an existing power line right of way.
(6) Based on 21 acres per mile of right of way affected (15 acres/miles from Sycan to Malin) and affecting wildlife requiring remote areas, old growth forest, and snags and other dead trees. (Based on 175' R/W).
(7&8) Direct" means when power line crosses production acreas of migration routes, or within 2 miles of raptor nesting sites. "Indirect means when power line is close enough to adversely affect these sites.

Walters Ferry visual impacts are similarly reduced through the presence of the Idaho State Highway 45 bridge across the Snake River. A 500 KV power line in this area would add another manmade feature to the landscape with an attendant reduction in the historical setting as seen from the historic feature or site.

Visual impacts on historic sites are assessed in TABLE VIII-15, using a relative rating of High (H), Medium (M), and Low (L).

LAND USE

The cause and type of impacts would be the same as discussed for the applicant's proposed route in Chapter III; however, impacts would vary in magnitude. Mitigating measures would be the same as for the proposed route.

Grazing

The primary effect on grazing would be the temporary loss of 23.5 animal unit months of livestock forage during the construction period and a permanent loss of vegetation on 67 acres. Total forage loss for the 50-year life of the project, including the construction period, would amount to 220.3 animal unit months. This loss would have a negligible impact on the livestock industry.

Agricultural

Agricultural production would be lost on 24 acres for a one-year, construction period, and on 3.9 acres on a permanent basis. This would be the area, .015 acres per tower, within tower sites. Vegetative cover would not be lost. There would also be a hazard of shock hazards in the use of machinery and irrigation equipment under or immediately adjacent to the power line.

Forestry

Commercial timber production would be foregone on 609 acres, six acres permanently removed from production and 603 acres altered to a non-commercial forest type, with an annual loss of 235,000 board feet. This would be an annual loss of $35,250 based on a stumpage value of $150 per thousand board feet, with an accompanying annual loss of 1.2 man years of employment in the wood products industry. Total loss for the 50-year project life would amount to 11,750,000 board feet, with an accompanying loss of 60 man-years of employment in the wood products industry.

Urban-Surburban

Residential impacts would be the same as discussed in Chapter III for the proposed route. This alternate route would affect more residences than the proposed route, although data on numbers is not available, because it would traverse through heavier populated areas.

TABLE VIII-15

VISUAL IMPACTS - HISTORIC SITES

Proposed Power Line As Viewed From:	Type of Intrusion	Historical Significance	Historical Setting	Visual Contrast	Unmitigated Impact	Unavoidable Impact
Oregon Trail	Trail crossing and partial visibility	H	L	H	H	H
Three Island crossing State Historical Park	Partial visibility	H	M	L	M	L
Walters Ferry	Partial visibility	M	L	L	L	L
Fort Harney Site	Partial visibility	L	L	L	L	L

ESTHETICS

Temporary impacts resulting from construction of the transmission line are basically identical to those of the proposed route. Proposed route mitigating measures for temporary impacts apply to all alternate route segments.

Significant esthetic impacts and mitigation for Alternate Route I segments are as follows:

Midpoint to Hagerman Segment

See Proposed Route.

Hagerman to Walters Ferry Segment

Alternate Route I segment would cross four major transportation routes (Interstate 80N, U.S. Highways 26 - 30 - 20, Idaho State Highways 68 and 45) with a total annual daily traffic of 12,720 vehicles, together with 19 secondary roads. The route segment at each highway and road crossing would be visible over extensive distances (5 miles) due to the generally level terrain and open landscape character of the area. Visibility would be particularly pronounced during reflective light conditions. The U.S. Highways 26 - 30 - 20 and State Highway 68 crossings are preceded by existing transmission lines.

Alternate route crossing of the moderately scenic Snake River would result in an additional major manmade landscape intrusion partially visible from the community of Glenns Ferry and Three Island State Historical Park.

The alternate route would be partially visible from Interstate 80N and the community of Mountain Home against the moderately scenic backdrop of the Danskin Mountains and Mount Bennett. 1972 annual daily traffic at the route crossing of Interstate 80N was 7,000 vehicles. Visibility would be particularly pronounced during afternoon reflective light conditions.

It would be partially visible from the northern rim areas of the Snake River Birds of Prey Natural Area. Visibility would be particularly pronounced under morning and afternoon reflective light conditions. The Birds of Prey Natural Area received an estimated 5,000 visitor days in 1974.

The alternate route crossing of the Snake River near Walters Ferry would represent an inharmonious natural landscape intrusion partially visible from State Highway 45 and the southern extremity of the Snake River National Wildlife Refuge. State Highway 45 near the route crossing of the Snake River was utilized by an estimated 420 vehicles daily in 1972.

Reflective light visual impacts for the entire route segment, and particularly in such areas as the Snake River crossings, that portion of the route paralleling Interstate 80N, that portion adjacent to the Snake River Birds of Prey Natural Area, and all major and secondary transportation route crossings, could be lessened through the use of nonspecular conductors and

treated tower steel. Stringing the "sock line" by helicopter and restricting all road-trail construction on canyon slopes at the Snake River crossings would minimize landscape disturbances and subsequent visual impacts. Location of tower structures to minimize "skyline" visibility as seen from the Snake River and adjacent highways would further reduce visual impacts. Vegetative clearing measures for the proposed route would reduce visual impacts, particularly in the juniper and coniferous vegetative types. Visual impacts at all major and secondary transportation route crossings could be lessened through locating tower structures as far back from highway and roads as possible.

Effectiveness of mitigation measures in reducing esthetic impacts would be similar to that of the proposed route. Specific unavoidable adverse esthetic impacts, rated on a relative scale of High (H), Medium (M) and Low (L) are shown in TABLE VIII-16.

Walters Ferry to Sycan Flat Segment

This alternate route segment would cross six major transportation routes (U.S. Highways 20, 20-395, 95, 395 and State Highway 31) with a total annual daily traffic of 4,000 vehicles, together with 25 secondary roads. The route segment at each highway crossing would be visible over extensive distances (1 - 5 miles) due to the level to rolling terrain and open landscape character of the area. Visibility at all highway and road crossings would be particularly pronounced under reflective light conditions.

The route would be partially visible against the moderately scenic backdrop of the Owyhee Mountains from the communities of Homedale and Marsing, Idaho, several scattered residences and several major and secondary transportation routes adjacent to the Snake River. Visibility would be particularly pronounced during morning reflective light conditions. Visual impacts are partially reduced by the presence of existing natural landscape intrusions, including agriculture lands, residences and related improvements.

The alternate route crossing of the Snake River - McKenzie campsite "viewshed" of the State Highway 95 overlook south of Marsing, Idaho, would represent an inharmonious natural landscape intrusion detracting from the scenic and historical interpretation purposes of the overlook. Visibility would be particularly pronounced during afternoon reflective light conditions. State Highway 95 adjacent to the overlook received an estimated 770 vehicles daily in 1972.

The crossing of the Owyhee River would represent an inharmonious landscape intrusion across a moderately scenic canyon area. Visual impacts would be increased by the required location of tower structures within the one-mile canyon. It would cross the primary access road, situated within the canyon proper, leading to Owyhee Dam and Reservoir, Owyhee Reservoir, including Lake Owyhee State Park, received an estimated 163,135 visitor days in 1974. Visibility from the Owyhee Dam - Reservoir recreation use areas access road would be increased under reflective light conditions.

TABLE VIII-16

ESTHETIC IMPACTS

(Hagerman to Walters Ferry)

Proposed Power Line As Viewed From:	Type of Intrusion	1/ Sensitivity Level	1/ Scenery Class	1/ Visual Contrast	Unmitigated Impact	Unavoidable Impact
U.S. Highway 26-30-20	Highway Crossing	M	M	H	H	M
State Highway 68	Highway Crossing	M	L	H	H	M
Interstate 80N	Highway Crossing	M	L	H	H	M
State Highway 45	Highway Crossing	M	L	H	H	M
Snake River (Glenns Ferry)	River Crossing	M	M	H	H	M
Parallel Interstate 80N	Partial Visibility	M	L	M	M	L
Snake River Birds of Prey Natural Area	Partial Visibility	H	H	M	H	M
Snake River (Walters Ferry)	River Crossing	M	L	H	H	M

1/ See definitions - Chapter III, Esthetics

The crossing of the Stinking Water Mountains would represent an inharmonious natural landscape intrusion through a moderately scenic area. The alternate route crossing immediately adjacent to Warm Springs Reservoir would represent an inharmonious natural landscape intrusion visible from the southern portion of the reservoir. Visibility would be increased through right-of-way clearing of the juniper vegetative type and during reflective light conditions.

The alternate route, in the Stinking Water Mountains area, would cross the proposed High Desert Trail. Visual impact would be dependent upon actual development of the trail and the number of future users.

Across the northern extremity of the Harney Basin, the route would be partially visible from the communities of Burns and Hines, several ranches and residences, together with 18 parallel miles of U.S. Highway 20. 1973 annual daily traffic at the route crossing of U.S. Highway 20 was 1,000 vehicles daily. Visibility could be expected to be more pronounced during reflective light conditions. Impacts would vary greatly depending upon the proximity of individual residences and would be greatest for those immediately adjacent to the proposed right-of-way.

The crossing of Wagontire Mountain would represent an inharmonious landscape intrusion across a moderately scenic area, particularly to deer hunters and local ranch residents. Visibility would be increased through right-of-way clearing of the juniper vegetative type.

The alternate route would be partially visible from the southern portion of the Lost Forest Research Natural Area and from the southern slope of the Christmas Lake Valley Sand Dunes. Visibility would be particularly pronounces during periods of reflective light conditions.

The alternate route segment through the Fremont National Forest would represent inharmonious natural landscape intrusion through a moderately scenic area. Visibility would be increased through right-of-way clearing of the mixed conifer vegetative type and the subsequent modification of natural vegetative patterns, including a tunnel effect. Visibility could be expected to be more pronounced during reflective light conditions.

Reflective light visual impacts for the entire route segment, and particularly in such areas as the Owyhee River crossing, Stinking Water Mountains, Harney Basin, Wagontire Mountain and Fremont National Forest, could be lessened through the use of nonspecular conductors and treated tower steel. Visual impacts at the Owyhee River crossing could be lessened through locating of tower structures to minimize "skyline" visibility as seen from the canyon bottom. Owyhee River crossing visual impacts can be further lessened through the use of nonspecular conductors and treated tower steel. Visual impacts at the Owyhee River crossing could be lessened through locating of tower structures to minimize "skyline" visibility as seen from the canyon bottom. Owyhee River crossing visual impacts can be further lessened through stringing the "sock line" by helicopter and restricting all road-trail construction and its subsequent landscape scarring on canyon slopes visible from the river. Stringing the "sock line" by helicopter through the Stinking Water Mountains, Wagontire Mountain and Fremont National Forest would reduce surface disturbance and visual impacts.

Visual impacts resulting from vegetative right-of-way clearing, particularly in the Stinking Water Mountains, Wagontire Mountain and Fremont National Forest areas, could be lessened through application of proposed route mitigation measures.

Visual impacts at all major and secondary transportation route crossings can be lessened through application of proposed route mitigating measures involving tower placement and retention of screening vegetation. Primary visual impacts at the U.S. Highway 95 overlook of the Snake River and McKenzie Campsite could be avoided through minor route relocation to the south of the overlook. Primary visual impacts through crossing Wagontire Mountain could be avoided through minor route relocation to the south of the mountain.

Effectiveness of mitigating measures in reducing esthetic impacts would be generally similar to that of the proposed route. Specific unavoidable adverse esthetic impacts are shown in TABLE VIII-17.

TABLE VIII-17
ESTHETIC IMPACTS
(Walters Ferry to Sycan Flat)

Proposed Transmission Line As Seen From:	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Unmitigated Impact	Unavoidable Impact
U.S. Highway 95	Highway Crossing	M	L	H	H	M
U.S. Highway 20	Highway Crossing	M	L	H	H	M
U.S. Highway 395	Highway Crossing	M	L	H	H	M
U.S. Highway 20-395	Highway Crossing	M	L	H	H	M
U.S. Highway 395	Highway Crossing	M	L	H	H	M
State Highway 31	Highway Crossing	M	M	H	H	H
State Highway 95 Overlook	Visibility	H	L	H	H	M 1/
Owyhee River	River Crossing	H	M	H	H	M
Stinking Water Mountains	Mountain area Crossing	M	M	H	H	H
Harney Basin including Burns and Hines	Partial Visibility	M	L	M	M	L
Wagontire Mountain	Mountain Area Crossing	M	M	H	H	M 1/
Lost Forest RNA-Christmas Lake Valley Sand Dunes	Partial Visibility	M	L	M	M	L
Picture Rock Pass to Foster Butte - Fremont N.F.	Mountain Area Crossing	M	M	H	H	H

1/ Impacts avoidable through minor route relocation

Sycan Flat to Malin Segment

The alternate route segment would result in increased right-of-way visibility through additional clearing (widening) of the mixed conifer vegetative type as seen from the Sycan Flat, Sprague River Valley including State Highway 140 crossing, and the settlement of Beatty, and the Langell Valley including the community of Bonanza.

Visual impacts associated with the existing BPA-PGE 500 KV transmission line right-of-way could be partially reduced through "feathered or graded" vegetative clearing, with curved or undulating boundaries, blending into the existing cleared right-of-way. Use of nonspecular conductors and treated tower steel would further reduce visual impacts. Stringing the "sock line" by helicopter through Fremont National Forest areas would further reduce visual impacts by reducing right-of-way clearing and road-trail development with its attendant increase in landscape scarring. Visual impacts at all major and secondary transportation route crossings could be lessened through application of proposed route mitigating measures involving tower placement and retention of screening vegetation.

Mitigation could partially lessen the existing adverse "tunnel effect" esthetic impact resulting from PGE-BPA right-of-way clearing. Effectiveness of other mitigating measures in reducing esthetic impacts would be similar to that of the proposed route.

RECREATION

See proposed route, Chapter III for general discussion of recreation impacts applicable to all alternate routes. Specific alternate route recreation impacts are as follows:

Midpoint to Hagerman Segment

See Proposed Route.

Hagerman to Walters Ferry Segment

The route segment crossings of the Snake River would result in some reduction in the fishing, boating, waterfowl hunting-observation and general sightseeing recreation quality experiences. The extent of this potential impact, which is partially lessened by the presence of existing transmission lines at the Glenns Ferry crossing, cannot be accurately estimated due to a lack of specific visitor use data.

The route segment crossing near the Snake River Birds of Prey Natural Area could result in a reduction in the nature study, photography and general sightseeing recreation quality experiences for some visitors to the northern portion of the area. Visitor use data upon which to estimate the extent of this potential impact is not available. The overall Birds of Prey Natural Area received an estimated 5,000 visitor days of use in 1974.

The Snake River Birds of Prey Natural Area requires review and recommendation for wilderness designation by July 1, 1980, in accordance with Public Law 94-579, Federal Land Policy and Management Act of 1976. The alternate route right-of-way could be a factor affecting study and recommendation for wilderness designations and management.

Some increase in general off-road vehicle use could occur along and adjacent to the route segment. The extent of potential impact is increased by the route's close proximity to Snake River Plain population centers, including Glenns Ferry, Mountain Home, Boise and Nampa. The extent of this potential impact is not quantifiable.

Mitigating measures for esthetic impacts would be partially effective in lessening recreation impacts at the Snake River crossings and the Snake River Birds of Prey Natural Area. Proposed route mitigating measures limiting road-trail development would lessen potential off-road vehicle increases and the attendant impact on recreation resources.

Walters Ferry to Sycan Flat Segment

The route segment across the Stinking Water Mountains, Wagontire Mountain and Fremont National Forest would result in some reduction in the deer hunting and general sightseeing recreation quality experiences. Specific visitor use data upon which to estimate the extent of these potential impacts is not available.

The alternate route segment through the Stinking Water Mountains, Wagontire Mountain and Fremont National Forest areas would provide increased deer hunting and general recreation access. The Oregon Wildlife Commission Big Game Units comprising the Stinking Water Mountains (Malheur River Unit) Wagontire Mountain (Wagontire Unit) and Fremont National Forest area (Silver Lake Unit) indicate a total of 24,450, 3,300 and 32,230 hunter days respectively in 1973. Although the number of hunters utilizing the specific route area is unknown, some increase in hunting and off-road vehicle use could occur.

The route segment crossing near the Lost Forest Research Natural Area and Christmas Lake Valley Sand Dunes could result in a reduction of the general sightseeing recreation quality experiences for some visitors to the southern portion of the areas. Visitor use data upon which to estimate the extend of this impact is not available. The overall Lost Forest Research Natural Area and Christmas Lake Valley Sand Dunes receive an estimated 1000 visitor days of use annually.

The Lost Forest Research Natural Area requires review and recommendation for wilderness designation by July 1, 1980, in accordance with Public Law 94-579, Federal Land Policy and Management Act of 1976. The alternate route right-of-way could be a factor affecting study and recommendation for wilderness designation and management.

Some increase in general off-road vehicle use could occur along and adjacent to the remainder of route segment. The extent of this increase and its subsequent resource impacts, based upon other utility rights-of-way in the region, would be of a limited nature.

Mitigating measures for esthetic impacts would be partially effective in lessening recreation impacts. The prohibiting of new permanent roads and the "putting to bed" of all temporary roads would reduce but not eliminate off-road vehicle travel and its attendant increase in recreation use problems and conflicts along and adjacent to the transmission line.

Sycan Flat to Malin Segment

No further major recreation impacts would result through an additional 500 KV right-of-way parallel to the existing rights-of-way.

SOCIOECONOMIC CONDITIONS

The impacts of construction and operation of a 500 KV power line along this alternative route are very similar to those of the proposed route. The construction activity would cause basically the same effects on population, employment, income and social factors--but the resulting impacts would involve different communities. If the power line were constructed along this alternative route, the communities of Twin Falls, Jerome, Wendell, Glenns Ferry, Mt. Home, Boise, Nampa, Caldwell, Marsing and Homedale, Idaho could be affected. Building the power line on this alternate route could affect the Oregon communities of Nyssa, Vale, Harper, Juntura, Burns and Hines, Wagontire and Klamath Falls. It is likely that "permanent headquarters" for this alternative would include Twin Falls, Boise-Nampa-Caldwell, Idaho, Burns, and Klamath Falls, Oregon. Other communities along the route would experience incidental or intermittent use by construction crews.

This alternate route would be approximately 50 miles longer than the applicant's proposed route which would increase construction cost. Due to the longer length of line required, the construction period would be about 13 percent longer which would prolong the temporary economic impacts. Since more cultivated land and land in private ownership is involved, right-of-way acquisition costs would be higher.

Construction of the power line along this alternate route would not include opening a new access road in a relatively large area that is presently without major roads. This alternate route would avoid many of the areas which have high social values.

Operation and maintenance of the power line along this alternate route would result in impacts very similar to those of the proposed route. The longer line would require more of a capital investment, hence a greater yield of tax revenues. The same counties would be affected as in the proposed route in Oregon. In Idaho, Ada County would derive some of the tax revenue in addition to the counties which would receive revenues from construction along the proposed route.

ALTERNATE ROUTE II

Description

Alternate Route II (FIGURE VIII-5) would be the same as the applicant's proposed route from Midpoint to the point northwest of the Snake River near Hagerman, then the same as Alternate Route I to just west of the Snake River crossing near Walters Ferry. At that point, Alternate Route II would swing southwesterly, crossing the northern end of the Owyhee Mountains, cross the Idaho-Oregon border and U.S. Highway 95 about four miles north of Sheaville, and continue on southwesterly. It would cross southeast of the Jordan Crater Lava Beds, and cross U.S. Highway 95 about 14 miles west of Antelope Reservoir. After crossing the highway, it would meet the applicant's proposed route about six miles east of Rome, Oregon. From that point, Alternate Route II would be the same as the applicant's proposed route on to the Malin substation.

This alternate route would be about 411 miles long. About 61% of the route would cross national resource lands in Idaho and Oregon administered by the Bureau of Land Management. National Forest lands that would be crossed would be the same as that of the applicant's proposed route.

The same expansion of the Midpoint (10 acres) and Malin (9 acres) substations would be required as for the proposed route as well as a five acre reactor station near Fields. It would require approximately 1,775 towers which would occupy 27 acres. Tensioning pads would disturb about three acres and temporary access road construction would disturb about 242 acres. Tower footings would disturb about eight acres.

Description of the Environment

The Midpoint to Hagerman, Owyhee to Catlow and Catlow to Malin route segments would be identical to the applicant's proposed route (Chapter II). The Hagerman to Walters Ferry segment would be the same as Alternate I discussed in this chapter.

The Walters Ferry to Owyhee Junction segment is the only new segment in this alternate route, and is discussed as follows:

CLIMATE AND AIR QUALITY

The general climate and air quality along this 57 mile segment is about the same as discussed in Chapter II. The route would pass through sparsely settled desert shrub-grass type used primarily for grazing purposes.

GEOLOGY/TOPOGRAPHY

The geology of the area associated with Alternate Route II can be divided into six broad geological and landform areas. These are (1) loess-covered basaltic plains and volcanoes, (2) thin loess-covered rhyolitic hills and plains, (3) rhyolitic hills and mountains, (4) basaltic mesas, (5) rockland, rough broken and stony canyon land and escarpments, and (6) mixed alluvium on stream terraces and stream bottoms.

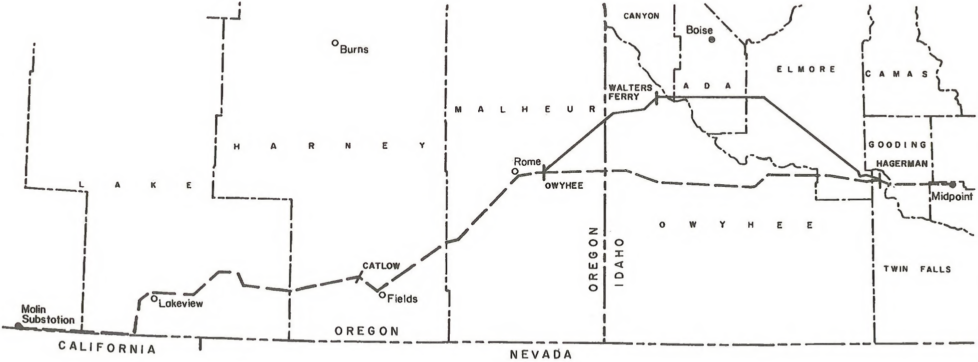


FIGURE VIII-5
Alternate Route II ———
Proposed Route — —

MINERAL RESOURCES

No mineral resources were identified along this alternate route segment.

SOILS

TABLE VIII-18 describes the soils that would be crossed by this alternate route segment.

WATER RESOURCES

This segment of the route covers two major streams--Reynolds Creek and Cow Creek. The streams have generally high water quality; essentially they are in a natural condition. Sediment yield is believed to be less than 0.1 acre-foot/square mile/year. The waters are primarily a calcium-magnesium bicarbonate type, low in dissolved solids and hardness.

Ground water aquifers over much of the area have not been tested. Recharge is chiefly from precipitation and ground water inflow. Ground water from alluvial deposits generally has less than 300 mg./1 dissolved solids, mostly calcium magnesium bicarbonate.

NOISE

Ambient noise levels have not been monitored or defined along this segment. The area is sparsely settled and used primarily for grazing purposes. Noise levels are assumed to be near that of nature.

VEGETATION

At Walters Ferry this alternate could turn southwest through a desert shrub type for 5 miles and then a grass type for 12 miles. Desert shrub type would resume for the next 5 miles until agricultural land would be crossed for about one-half mile near U.S. Highway 95. After crossing Highway 95, desert shrub prevails until the route would reach Owyhee Junction, with the exception of small areas of agricultural lands in the Cow Creek areas and Jordan Creek.

Vegetative data for this alternate route is summarized in TABLE VIII-19.

WILDLIFE

From Walters Ferry, this segment would pass through a wild horse range with about 260 animals near Reynolds Creek and Wilson Peak; past four antelope ranges with over 400 animlas; through a sandhill crane area with an undetermined number of birds near Cow Lakes; and past a deer winter range of 400 to 500 animlas near the Owyhee River. There is also a fairly large waterfowl concentration at the Cow Lakes and at Batch Lake, just north of Cow Lakes.

TABLE VIII-20 is a summary of wildlife distribution found along Alternate Route II, Midpoint to Malin.

TABLE VIII-18

SOILS TRAVERSED BY THE ALTERNATE ROUTE II CORRIDOR FROM ABOUT T.1 S, R.3 W BM IN IDAHO TO MALIN, OREGON

ALTERNATE ROUTE II

Soil Association					Classification			Position on Land scape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
Walter's Ferry to Owyhee Junction segment																			
8	2,000-3,000	7-12	120-165	Rangeland	Typic Haplargids	Fine-loamy, mixed, mesic	Nanyton	Terraces	Alluvium	Gravelly loam	Gravelly clay loam	Gravel	20-35 in profile	60"+	Moderately slow	Moderately slow	Good	Medium	Erosion alkaline; gravelly profile; droughtiness
20	5,500-8,000	15-25	20-80	Rangeland Forest land	Argic Pachic Cryoborolls	Fine-loamy, mixed	Harmehl	uplands (hills-level to steep)	Loess & basic igneous rock	Gravelly loam	Gravelly clay loam	Gravel	20-35 in profile	20-40" over bedrock	Moderately slow	Impervious	Good	Low	Erosion; gravelly profile
21	4,800-5,700	8-16	60-100	Rangeland Cropland	Ardic Lithic Haploxerolls	Loamy-Skeletal, mixed mesic	Bakeover	Uplands (lava plains	Basic igneous rock	Stony loam	Stony clay loam	Stones cobbles & gravel	20-35 in profile	10-20" over bedrock	Moderately slow	Impervious	Good	Low	Shallow over bedrock; stony profile

TABLE VIII-18

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze Free Season Days	Major land use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
3	4,000-5,500	8-12	90-120	Rangeland Cropland (hay)-irrigated	Haplic Durargids	Fine loamy, mixed, frigid		Fans & Terraces	Alluvium	Gravelly loam	Gravelly loam	Gravel	20-35 in profile	8-20" over silica duripan	Moderate	Impervious in duripan	Good	Low	Erosion; shallow over duripan; gravelly profile
22	4,800-5,700	8-16	60-100	Rangeland Forest land	---	---	Rockland	Uplands (plateaus)	Basalt bedrock	Variable	Variable	Gravel cobbles and stones	0-80 in profile	0-10" over basalt bedrock	---	Impervious	Good	Very low	Shallow over bedrock

ALTERNATE ROUTE II
Owyhee Junction to Catlow Junction segment
This segment of alternate route II is the same as the proposed route.

TABLE VIII-19

VEGETATIVE TYPE MILES BY ROUTE SEGMENT

ALTERNATE ROUTE II - MIDPOINT TO MALIN

Route Segment	Vegetative Type						
	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Aquatic	Total
Midpoint to Hagerman	13.5	5.0	---	7.5	---	---	26
Hagerman to Walters Ferry	76.0	---	---	23.0	---	---	99
Walters Ferry to Owyhee	41.0	12.0	---	4.0	---	---	57
Owyhee to Catlow	79.5	5.0	---	---	---	---	84.5
Catlow to Malin	63.0	17.0	41.5	6.0	15.5	1.5	144.5
Total	273.0	39.0	41.5	40.5	15.5	1.5	411

TABLE VIII-20

SUMMARY WILDLIFE DISTRIBUTION - MIDPOINT TO MALIN

ALTERNATE ROUTE II

Major Species	Midpoint to Hagerman	Hagerman to Walters Ferry	Walters Ferry to Owyhee Jnc.	Owyhee Jnc. to Catlow Jnc.	Catlow Jnc. to Malin	Total
Fish	1-	1-		2-		4-
Deer		1-	1-500	1-500	5-16,000	8-17,000
Antelope	1-100		4-400	4-500	7-200	16- 1,200
Bighorned Sheep				1,100		1- 100
Elk						
Waterfowl	2-	1-	2-	1-	4-1,000,000	10-1,000,0
Raptors	1-	1-	2-	2-	1-	7-
Threatened or Endangered	6-Spotted Bat Peregrine Falcon Prairie Falcon W. Ground Snake W. Snowy Plover Bald Eagle	Spotted Bat Peregrine Falcon Prairie Falcon W. Snowy Plover Bald Eagle	Spotted Bat Peregrine Falcon Prairie Falcon W. Snowy Plover Bald Eagle	5-Kit Fox Prairie Falcon Peregrine W. Ground Snake W. Snowy Plover	5-Kit Fox Prairie Falcon Peregrine Warner Sucker Bald Eagle	
Sagegrouse Strutting Grouse				1-	1-	2-
Wild Horses			1-260			1-260

Shown by number of concentrations or herds and by estimated population as possible. See actual overlays and maps for details. For example, "4-600" indicates 4 bands of antelope, etc. for a total of 600 individual animals.

ARCHAEOLOGICAL AND HISTORICAL VALUES

No archaeological investigations have been made along this route segment so no data is available. It is expected that archaeological sites would be found along, or near, most of the water courses. It would also pass about one mile from the J. B. Charbonneau Grave Site which is a Registered National Historic Place.

LAND USE

The primary land use along this sparsely populated segment is grazing and agriculture. Of the approximately 57 mile long segment, 53 miles are used for grazing and about 4 miles are agricultural, hay production.

Alternate Route II, between Walters Ferry and Owyhee Junction near Rome, Oregon, is in conflict with Management Framework Plans developed by the Boise, Idaho and Vale, Oregon BLM districts. MFP's have not been completed by the Vale, Burns and Lakeview districts for the areas that would be crossed by this alternate route, so no corridors have been identified.

ESTHETICS

This alternate route segment, beginning near Walters Ferry, would extend in a southwesterly direction across the northern extremity of the Owyhee Mountains. The Owyhee Mountains in this area are characterized by low mountainous terrain with scattered juniper-high desert shrub-grassland vegetation offering some visual contrast and moderate scenic values. The Owyhee Mountains portion of this route segment is free of major manmade landscape intrusions. Extending southwesterly of the Owyhee Mountains, the route segment would cross level to broken terrain characterized by extensive lava flow areas, high desert shrub-grassland vegetation and generally low visual contrast and scenic values. The route segment is situated within 4 miles of the southeast corner of the Bureau of Land Management administered Cow Lakes Recreation Site, which received an estimated 2,000 visitor days in 1974. With the exception of major highway and secondary roads, this portion of the route segment is basically free of major manmade landscape intrusions.

The route segment would cross one major transportation route (two crossings) and two secondary routes. 1973 annual daily traffic at the highway crossings was as follows:

U.S. Highway 95	620 A.D.T.
U.S. Highway 95	690 A.D.T.

Scenery-sensitivity factors for the route segment are as follows:

B3	21 miles
C2	36 miles

RECREATION RESOURCES

The primary recreation uses and activities along this route segment include limited deer and small game hunting in the Owyhee Mountains; camping, fishing and waterfowl hunting at Cow Lakes; sightseeing; nature study and photography at Jordan Craters Research Natural Area. The Charbonneau Grave Site receives low visitor use.

The route segment would pass within four miles of the Jordan Craters Research Natural Area and six miles of the Cow Lakes Recreation Site.

SOCIOECONOMIC

Refer to Alternate Route I description and to Chapter II, Socioeconomic Conditions.

Analysis of Impacts - Alternate Route II

GENERAL

Chapter IV mitigating measures would apply to Alternate Route II.
Impacts upon the environment, that would result if Alternate Route II should be constructed, upon climate, air quality, geology/topography, minerals and noise would be about the same as those described for the proposed route in Chapter III. Temporary impacts, though minor, would be of slightly longer duration because Alternate II would be about 20 miles longer than the proposed route. Permanent impacts on foregoing resources would be about the same as for the applicant's proposed route.

SOILS

General impacts and assumptions for Alternate Route II are the same as discussed under the proposed route in Chapter III. Specific erosional impacts for the Walters Ferry to Owyhee Junction segment of this alternate route are shown in TABLE VIII-21. TABLES VIII-22 and 22a show potential soil loss for the entire alternate route caused by construction activities and during the operation and maintenance period.

Mitigating measures and their weighted effectiveness for Alternate Route II are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total soil tonnage saved which each mitigating measure achieves. TABLE VIII-23 shows the unavoidable impact on soils for the entire alternate for a 50-year project life, including the construction period.

WATER RESOURCES

Mitigating measures and their weighted effectiveness for Alternate Route II are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total sedimentation saved which each mitigating measure achieves. TABLE VIII-24 shows the total potential sediment yield for the entire Alternate Route II for a 50-year project life, including the construction period.

VEGETATION

The cause and type of environmental impacts would be the same as discussed for the proposed route in Chapter III, but would vary in magnitude. TABLE VIII-25 shows the temporary loss of vegetative cover, one year, during the construction period; TABLE VIII-26 shows the permanent loss of vegetative cover, after mitigating measures would be implemented, for the entire alternate route.

Other vegetative impacts on commercial forest vegetative type are the same as the proposed route.

WILDLIFE

Impacts on wildlife would be the same as the common segments of the proposed route and the Hagerman to Walters Ferry segment of Alternate Route I. The only difference in impacts on wildlife would occur in the Walters Ferry to Owyhee segment.

TABLE VIII-21

POTENTIAL SOIL LOSS

ALTERNATE ROUTE II - MIDPOINT TO MALIN

Soil Map Symbol	R Value	K Value	LS Value	Potential Soil Loss (Tons/Acre/Year)
		Hagerman to Walters Ferry		
8	10	.30	.6	1.8
20	10	.31	.8	2.5
21	10	.31	.8	2.5
5	10	.27	.4	1.1
22	10	---	.2	---
Average Loss				2.0

Increased off-road vehicle use could cause additional hunting pressure and/or harassment of the deer and antelope using the habitat along the route. Harassment of the wild horse herd could also occur. TABLE VIII-27 shows the adverse impacts on wildlife, after mitigative measures would be implemented.

ARCHAEOLOGICAL AND HISTORICAL VALUES

Detailed cultural surveys have not been made so impacts on archaeological sites and values are not known. Mitigating measures listed in Chapter IV would reduce the impact to about the same level as for the proposed route.

A visual impact, if this route should be used, would occur at the Charbonneau Grave Site National Historic Place. Impacts on this site are shown in TABLE VIII-28.

LAND USE

The only difference, from that previously discussed for the proposed route and the common segment of Alternate Route II, would be in the Walters Ferry to Owyhee segment of Alternate Route II. A temporary vegetative loss, during construction, would amount to about 6.4 animal unit months of livestock forage and a permanent loss of 1.4 animal unit months of forage annually would occur on this segment. Forage loss for the 50-year life of the project, including the construction period, would amount to 80 animal unit months.

Other land use impacts, for segments common to the proposed route and Alternate Route I have been previously discussed.

TABLE VIII- 22

NET POTENTIAL SOIL LOSS DUE TO CONSTRUCTION BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUTE II - MIDPOINT TO MALIN

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
Midpoint to Hagerman	0.12 - 0.62	1.1	65	24.0	71.5	47.5
Hagerman to Walters Ferry	0.12 - 9.37	1.0	222	1053.4	222	222
Walters Ferry to Owyhee Jct.	0.62	2.0	112	69.4	224	154.6
Owyhee Jct. to Catlow Jct.	0.12 - 1.25	1.9	181	124.9	343.9	219.0
Catlow Jct. to Malin	0.62	2.5	317	196.5	792.5	596.0
Total			397	1468.2	1653.9	1239.1

TABLE VIII- 22a

NET POTENTIAL SOIL LOSS DUE TO OPERATION AND MAINTENANCE BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUTE II - MIDPOINT TO MALIN

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
Midpoint to Hagerman	0.12 - 0.62	1.1	22	8.1	24.2	16.1
Hagerman to Walters Ferry	0.12 - 9.37	1.0	35	166.1	35.0	35.0
Walters Ferry to Owyhee Jct.	0.62	2.0	57	35.3	114.0	78.7
Owyhee Jct. to Catlow Jct.	0.12 - 1.25	1.9	104	71.2	197.6	126.4
Catlow Jct. to Malin	0.62	2.5	173	107.3	432.5	325.2
Total			391	388.1	803.3	581.4

TABLE VIII-23

POTENTIAL RESIDUAL SOIL LOSS AFTER MITIGATION

ALTERNATE ROUTE II - MIDPOINT TO MALIN

Route Segment	Net Potential Soil Loss (Tons) 1/
Midpoint to Hagerman	853
Hagerman to Walters Ferry	1972
Walters Ferry to Owyhee Jct.	4090
Owyhee Jct. to Catlow Jct.	6519
Catlow Jct. to Malin	16,846
Total	30,280

1/ The net potential loss is the erosion which takes place above the base level in the one year the soil is essentially bare plus 50 times the annual loss due to operation and maintenance. This is the unavoidable impact over the life of the project.

TABLE VIII- 24

TOTAL POTENTIAL SEDIMENT YIELD

ALTERNATE ROUTE II - MIDPOINT TO MALIN

Route Segment	Total Potential Sediment Yield From Acres Affected by Proposed Action For 50 Years (Ac/Ft)
Midpoint to Hagerman	0.21325
Hagerman to Walters Ferry	0.49300
Walters Ferry to Owyhee Jct.	1.02250
Owyhee Jct. to Catlow Jct.	1.62975
Catlow Jct. to Malin	4.21150
Total	7.57000

TABLE VIII- 25

TEMPORARY LOSS OF VEGETATIVE COVER (ONE YEAR)

ALTERNATE ROUTE II - MIDPOINT TO MALIN

Route Segment	Vegetative Type (Acres) Desert Shrub	Grass	Juniper	Agri-culture	Forest	Aquatic	Total
Midpoint to Hagerman	16	2	--	2	--	--	20
Hagerman to Walters Ferry	36	--	--	10	--	--	46
Walters Ferry to Owyhee	28	9	--	2	--	--	39
Owyhee to Catlow	62	3	--	--	--	--	65
Catlow to Malin	60	9	43	2	19	1	134
Total	202	23	43	16	19	1	304

Cause	Acres
Roads	242
Tower Site Clearing	27
Tower Footings	8
Tension Pads	3
Reactor Station	5
Midpoint Substation	10
Malin Substation	9
Total	304

TABLE VIII-26

PERMANENT LOSS OF VEGETATIVE COVER

ALTERNATE ROUTE II - MIDPOINT TO MALIN

Route Segment	Vegetative Type (Acres) Desert Shrub	Grass	Juniper	Agri-culture	Forest	Aquatic	Total
Midpoint to Hagerman	11	---	---	---	---	---	11
Hagerman to Walters Ferry	6	---	---	---	---	---	6
Walters Ferry to Owyhee	6	2	---	---	---	---	8
Owyhee to Catlow	15	---	---	---	---	---	15
Catlow to Malin	12	2	15	---	4	---	33
Total	50	4	15	---	4	---	73

(Roads = 49 acres, Reactor Station = 5 acres, Substations = 19 acres)

ESTHETICS

Alternate Route II, Walters Ferry to Owyhee segment, would cross one major transportation route (U.S. Highway 95) in two locations with a total annual daily traffic of 1,310 vehicles, together with two secondary roads. The route segment at each highway and road crossing would be visible over extensive distances (5 miles) due to the level to rolling terrain and open landscape character of the area. Visibility would be increased at both U.S. Highway 95 crossings due to the route's "angular" crossings, as opposed to right angle crossings. Visibility would be particularly pronounced under reflective light conditions.

The alternate route would extend approximately 15 miles through the moderately scenic (class B) northern extremity of the Owyhee Mountains. Esthetic impacts would result from visibility of an inharmonious landscape intrusion through a relatively undisturbed area. Visual impacts, depending upon the viewers position in the area, would be pronounced under reflective light conditions.

TABLE VIII-27

UNAVOIDABLE ADVERSE IMPACTS ON WILDLIFE HABITAT

ALTERNATE ROUTE II - MIDPOINT TO MALIN

	Deer Winter Range			Antelope Range			Wild Horse Range			(6) Forest Wildlife		(7) Waterfowl		(8) Raptors		New Access into Remote Areas	
		Acres			Acres			Acres				By No. of Sites		By No. of Sites			
Route Segment	Miles	Direct	Indirect	Miles	Direct	Indirect	Miles	Direct	In-direct	Miles	Acres Affect-ed	Direct	In-direct	Direct	In-direct	Miles	(3) Acres
	1/	2/	3/														
Midpoint to Hagerman	0	0	0	18	3.6	23,000	0	0	0	0	0	1	1	1	0	0	0
Hagerman to Walter's Ferry 4/ 5/	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0
Walter's Ferry to Owyhee	0	0	0	0	0	0	3	6	3,800	0	0	0	0	0	0	10	12,800
Owyhee to Catlow	0	0	0	11	2.2	14,100	0	0	0	0	0	0	0	0	0	12	15,400
Catlow to Malin	55	11.0	70,400	16	3.2	20,500	0	0	0	16	325	1	3	1	0	9	11,500
TOTALS	55	11.0	70,400	45	9.0	57,600	3	6	3,800	16	325	4	4	5	0	31	39,700

(1) Estimated miles of power line right-of-way passing through crucial big game or wild horse habitat.

(2) Based on .2 acres of vegetation permanently removed per mile of power line by ORV trail.

(3) Based on the effect of vehicles & people on animals for 1 mile on each side of trail (Lineal milage x 2 x 640 acres

(4) 12 miles of Snake River Birds of Prey natural areas near power line right-of-way.

(5) Adjacent to an existing power line right-of-way.

(6) Based on 21 acres per mile of right-of-way affecting wildlife requiring remote areas old growth forest, and those needing snags & other dead trees.

(7)
(8) "Direct" means when power line crosses production areas or migration routes or within 2 miles of a raptor nesting site. "Indirect" means when power line is close enough to adversely affect these sites.

TABLE VIII-28

Proposed Power Line As Seen From:	Type of Intrusion	Historical Significance	Historical Setting	Visual Contrast	Unmitigated Impact	Unavoidable Impact
Grave Site	Partial Visibility	H	H	M	H	M

The alternate route would be partially visible from the Jordan Crater Research Natural Area. Visibility will be particularly pronounced under afternoon reflective light conditions.

The Cow Lakes Recreation Site, the primary visitor use site adjacent to the Jordan Craters Research Natural Area, although about six miles from the alternate route segment, received an estimated 2,000 visitor days use in 1974.

Reflective light visual impacts for the entire route segment, and particularly that portion of the route extending through the Owyhee Mountains and that portion adjacent to the Jordan Craters Research Natural Area together with all major and secondary transportation route crossings, could be lessened through the use of non-spcular conductors and treated tower steel. Stringing the "sock line" by helicopter across lava flow areas and restricting road-trail development would reduce landscape scarring and its resultant visual impact. Vegetative clearing measures for the proposed route would partially reduce visual impacts for the overall route segment. Visual impacts at all major and secondary transportation route crossings could be lessened through locating towers as far back from highways and roads as possible. Effectiveness of mitigating measures in reducing esthetic impacts is similar to that of the proposed route.

Visual impacts are shown in TABLE VIII-29.

RECREATION RESOURCES

The alternate route would cross immediately adjacent to a Bureau of Land Management "Back Country Study Area" in the Wilson Peak-Reynolds Creek area of the Owyhee Mountains. The right-of-way would be a primary factor affecting future study and decision regarding "Back Country", primitive or wilderness designation and management.

The alternate route would extend for a distance of approximately 4 miles through the northern extremity of a Bureau of Land Management identified scenic area in the Twin Peaks area of the Owyhee Mountains. The right-of-way could be a primary factor affecting future study and decision regarding scenic area designation and management.

The Jordan Craters Research Natural Area is a potential roadless study area. Right-of-way visual impacts (see Esthetics - page VIII-89) could be a factor affecting future study and decision regarding wilderness designation and management.

Some limited reduction in general sightseeing and hunting recreation quality experiences would occur, at least to some visitors. No specific visitor use data is available upon which to determine extent of impact.

Some increase in off-road vehicle use, with its subsequent resource impacts, could occur along the route segment. Extent of impact should be of a limited nature.

Mitigating measures for esthetic impacts would be partially effective in lessening recreation impacts. Proposed route mitigating measures limiting road-trail development would lessen potential off-road vehicle impacts.

TABLE VIII-29

VISUAL IMPACTS - ALTERNATE ROUTE II

(Walters Ferry to Owyhee Segment)

Proposed Power Line As Seen From:	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Unmitigated Impact	Unavoidable Impact
U.S. Highway 95	Highway Crossing	M	L	H	H	M
U.S. Highway 95	Highway Crossing	M	L	H	H	M
Owyhee Mountains	Partial Visibility	L	M	H	H	M
Jordan Craters Research Natural Area	Partial Visibility	H	M	L	M	L

SOCIOECONOMIC CONDITIONS

Construction of the proposed power line along this route would result in impacts very similar to those which would result from the proposed route. From Rome, Oregon west to the Malin substation, this alternative route is identical to the applicant's proposed route, and impacts would be expected to be identical. The magnitude of economic impacts resulting from construction of this alternative would differ very little from those of the proposed routing.

The route is about 20 miles longer than the proposed route and would require more of a capital investment which would increase tax revenues among affected counties. Since more cultivated land and land in private ownership is involved in comparison with the proposed route, right-of-way acquisition cost would probably be higher.

Operation and maintenance would result in similar tax revenues, but would also include Ada County. The distribution or apportionment of the tax return revenue would differ in Idaho, but would be almost identical with that of the proposed route in Oregon. Those social values connected with land uses south of the Snake River in Idaho would be unaffected as in Alternate Route I.

ALTERNATE ROUTE III

Description

Alternate Route III (FIGURE VIII-6) would be the same as the applicant's proposed route from the Midpoint substation on west through southern Idaho and southeastern Oregon until it would enter the northeast part of Catlow Valley at the mouth of Long Hollow. At this point, it would leave the applicant's proposed route and run northwest through the western part of Catlow Valley to a point about one mile northeast of the northeast corner of Hart Mountain National Antelope Refuge. From this point, it would continue northwesterly to near the mouth of Orijana Canyon, about 4 miles north of the refuge, then on west, crossing U.S. Highway 395 about five miles north of Lake Abert. It would continue westerly, cross Oregon State Highway 31 about four miles southeast of Summer Lake. After crossing the highway, it would continue on west through the Fremont National Forest until it would intersect two 500 KV transmission lines at the south end of Sycan Flat. From this point, it would parallel the two existing lines south to Malin (same as Alternate Route I).

This alternate route would be about 429 miles long. About 63% of the route would cross national resource lands in Idaho and Oregon administered by the Bureau of Land Management and about 10% across National Forest lands administered by the Forest Service.

The same expansion of the Midpoint (10 acres) and Malin (9 acres) substations would be required as for the proposed route. The five acre reactor station would also be required near Fields, Oregon.

This alternative would require about 1,853 towers which would occupy 28 acres. Tensioning pads would disturb about three acres, tower footings about nine acres, and temporary access roads about 233 acres.

Description of the Environment

Alternate Route III would be the same as the applicant's proposed route between the Midpoint substation and Catlow Junction. It would also be the same as the Sycan Flat to Malin segment of Alternate Route I. Therefore, this discussion will relate only to the new route segment, Catlow Junction to Sycan Flat.

CLIMATE AND AIR QUALITY

The general climate and air quality along this 131 mile route segment is very similar to that of the Catlow to Malin segment of the proposed route. The route would pass through a very sparsely populated area used primarily for grazing purposes.

GEOLOGY/TOPOGRAPHY

This route mostly traverses the basin valleylands physiography. Drainage is internal, into several large closed basins from the surrounding highlands.

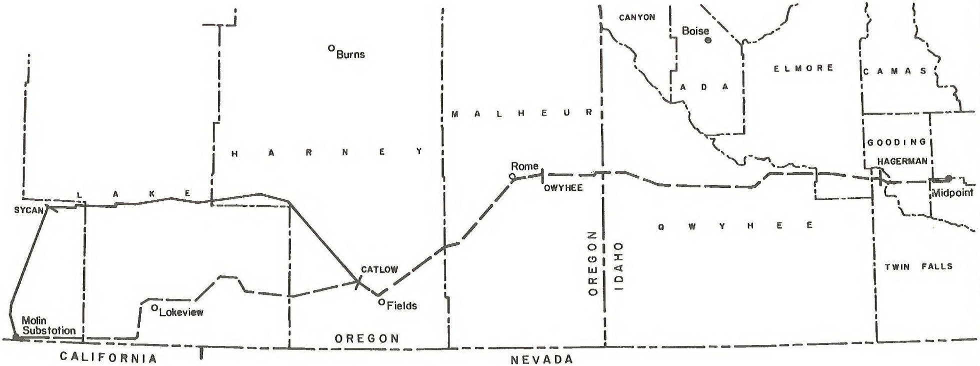


FIGURE VIII-6
Alternate Route III ———
Proposed Route — — —

The major closed basins are the Catlow, Warner Lakes, Lake Abert and Summer Lake. These basins are between 4,000 and 4,600 feet elevation. Pluvial lakes occupied these basins during the Pleistocene period, and the basin floors are underlain by lacustrine sediments. Post-glacial climatic changes resulted in the recession of lake levels to the present-day situation.

The major part of the area is underlain by Miocene to Recent age lava flows and interbedded tuffaceous sediments. Fault block basins are present throughout the lava plains, and steep escarpments mark fault traces.

MINERAL RESOURCES

This segment would not cross any known mineral resource areas. It would cross a Known Geothermal Resource Area south of Summer Lake.

SOILS

TABLE VIII-30 describes the soils that would be crossed by this Alternate Route III segment between Catlow Junction and Sycan Flat.

WATER RESOURCES

The streams on the western side of the segment show two annual peaks, one in December, and a second in April or May from snowmelt. These streams are the Chewaucan River which drains into Lake Abert, and Deep and Honey Creeks which drain into the Warner Lakes. Streams around Catlow Valley have only one annual peak, in April or May.

The streams have generally high water quality; essentially they are in a natural condition. Sediment yield is believed to be less than 0.1 acre-foot/square mile/year. The nutrient balance together with the hydrologic regiment produces an ideal ecology for biological productivity and bird habitat. The waters are primarily a calcium-magnesium bicarbonate type, low in dissolved solids and hardness.

The lakes into which these streams drain are subject to intense evaporation and the mineral content of these waters may be several hundred times that of the streams. Several of these lakes contain water with a dissolved solids content in excess of 30,000 mg./1. As the mineral concentration increases, certain salts will precipitate out - calcium carbonate and calcium sulfate (gypsum) are the least soluble. The dissolved solids content consists of sodium, bicarbonate, and chloride.

This area is underlain by alluvial deposits and rock aquifers which are capable of yielding moderate to large supplies at many places. The availability of ground water is limited by the depth to water, which is over 500 feet in many places and over 1,000 feet at some locations. The annual recharge rate is small and this places additional limitations on the use of ground water.

TABLE VIII-30

SOILS TRAVERSED BY ALTERNATE ROUTE III R-O-W CORRIDOR FROM MIDPOINT, IDAHO TO MALIN, OREGON

Soil Association					Classification			Position on Land scape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
Catlow Junction to Sycan Flat																			
10	1,000-8,000	8-13	80-120	Rangeland Cropland	Lithic Xerollic Haplargids	Clayey, mixed, frigid	Hart	Uplands (gently sloping Plateaus)	Basic igneous rock	Very stony loam	Clay	Stones	35-80 in top 10"	10-20" over bedrock	Slow	Impervious	Good	Low	Shallow over bedrock; stony surface soil
8	2,000-3,000	7-12	120-165	Rangeland Cropland (cereals, potatoes, sugar beets, beans & hay irrigated	Typic Haplargids	Fine loamy mixed mesic	Nanyton	Terraces	Alluvium	Gravelly loam	Gravelly clay loam	Gravel	20-35 in profile	60"+	Moderately slow	Moderately slow	Good	Medium	Erosion; alkaline; gravelly profile; droughtiness
7	4,000-5,000	8-10	90-130	Rangeland Cropland	Haplic Xerollic Durargids	Fine-Loamy, mixed, mesic	Flagstaff	Basins & terraces	Lake sediments races	Silt loam	Silty clay loam	None	---	20-40" over hardpan	Moderately slow	Impervious in hardpan	Somewhat poor	Low & med.	Moderately deep over hard pan; alkaline soil

TABLE VIII-30

SOILS TRAVERSED BY ALTERNATE ROUTE III R-O-W CORRIDOR FROM MIDPOINT, IDAHO TO MALIN, OREGON
(Continued)

Soil Association					Classification			Position on Land scape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water holding Capacity	Major Soil Problems
11	4,000-5,000	8-10	90-100	Rangeland Cropland	Typic Torrisamments	Mixed, frigid	Bonnick	Terraces	Basic igneous rock	Loamy sand	Loamy sand	None	---	60"+	Very rapid	Very rapid	Somewhat excessive	Low	Erosion; sandy profile
2a	4,300-7,000	18-35	30-50	Forest	Cryorthents	Coarse-loamy, mixed, cindery	Lapine	Plateau	Ash	Loamy, sandy	Coarse sand	Gravel	30	40-60	Excessive	Excessive	Very rapid	Medium	Erosion; droughtiness
2c	4,500-5,500	15-18	50-90	Rangeland	Lithic Argixerolls	Clayey, mont., frigid	Merlin	Tablelands	Tuff	Stony loam	Clay	Stone	10	10-20	Slow	Impervious	Well	Very low	Stoniness Shallow depth

Sycan Flat to Malin segment
This route is the same as for Alternate Route I.

Ground water quality is generally poorer than other areas. Dissolved solids are normally less than 1,000 mg./1 with excessive sodium, boron, and fluoride causing problems at some wells. This area contains thermal springs.

NOISE

Ambient noise levels have not been monitored or defined along this segment. As the area is very sparsely populated and used primarily for grazing purposes, noise levels are assumed to be near that of nature.

VEGETATION

At Catlow Junction, the route would turn and run northwest for some 45 miles through desert shrub types. Near Orijana Canyon and the north end of Warner Valley, it would turn to a generally westerly direction and continue through desert shrub types for another 28 miles. As it would drop off Abert Rim a grass type (crested wheatgrass seeding) would be crossed for 2 miles, and then desert shrub resumes for about 22 miles until reaching the Paisley Flat area north of Paisley, Oregon. Here, grass types would be crossed for 4 miles, then desert shrub for 2 miles, and grass for 3 miles until reaching State Highway 31. Just west of Highway 31 the route would enter a juniper type, which grades into coniferous forest as the elevation rapidly rises and the route would enter the Fremont National Forest. The coniferous forest type, interspersed with relatively small grass areas, prevails until reaching the east side of the Sycan Flat area. Crossing Sycan Flat, a low sage desert shrub type is dominant until this alternate would join Alternate I (Sycan Flat Junction).

Vegetative type, by miles of route segment, are shown on TABLE VIII-31 for Alternate Route III in its entirety.

TABLE VIII-31
VEGETATIVE TYPE MILES BY ROUTE SEGMENT
ALTERNATE ROUTE III - MIDPOINT TO MALIN

	Vegetative Type						
Route Segment	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Aquatic	Total
Midpoint to Hagerman	13.5	5.0	---	7.5	---	---	26
Hagerman to Owyhee	101.0	17.0	---	18.0	---	---	136
Owyhee to Catlow	79.5	5.0	---	---	---	---	84.5
Catlow to Sycan Flat	106.0	11.0	3.0	---	11.0	---	131
Sycan Flat to Malin	1.0	5.0	20.0	3.0	22.5	---	51.5
Total	301.0	43.0	23.0	28.5	33.5	---	429

WILDLIFE

From Catlow Junction, the 131-mile-long segment would pass through four antelope ranges totaling about 750 animals, through the southern tip of a deer range with about 200 deer, and through one wild horse range and past another with a total of about 400 animals (FIGURE VIII-7). While the route would not go through waterfowl concentrations, it would pass within three or four miles of the Warner Valley, Abert and Summer Lake waterfowl concentration areas. The route would cross the major waterfowl flyway between Harney Basin and Warner Valley and the majro flyway extending past Summer Lake. One marsh would be crossed in Catlow Valley, and two skirted (Chewancan and Sycan marshes). All marshes crossed or adjacent to the route have resident waterfowl and shore birds present. Some waterfowl losses could be anticipated from local feeding and, breeding populations near Summer Lake flying into the powerline. This segment would cross the upper Sycan River near Currier Guard Station. Some native trout and cyprinids inhabit that stream.

Wildlife distribution is summarized in TABLE VIII-32.

ARCHAEOLOGICAL AND HISTORICAL VALUES

No archaeological investigations have been made along this alternate route segment so no data is available. It is expected that archaeological sites would be found along, or near, most water courses and areas.

No historical sites are known to exist along the segment.

LAND USE

The land that would be traversed by this segment is devoted to range and forest use. Wildlife habitat and open space recreation are also important land uses.

The vast majority of the lands are in federal ownership, with the Bureau of Land Management administering most of the range lands and the Forest Service the timbered lands. Rangelands comprise about 120 miles, 92 percent, of the segment; forest lands account for the other 8 percent, 11 route miles.

There are no agricultural lands along the route in this segment, no special land use areas, and no communities within three miles of the alternate route segment.

Alternate Route III, between Hagerman and the Idaho-Oregon state line, conflicts with Management Framework Plans developed by the Boise, Idaho BLM district. However, between the Idaho-Oregon state line and Owyhee Junction it is compatible with the MFP developed by the Vale, Oregon BLM district. MFP's have not been completed by the Vale, Burns, and Lakeview districts for the areas that would be crossed by this alternate route between Owyhee Junction and Malin, so no corridors have been identified.

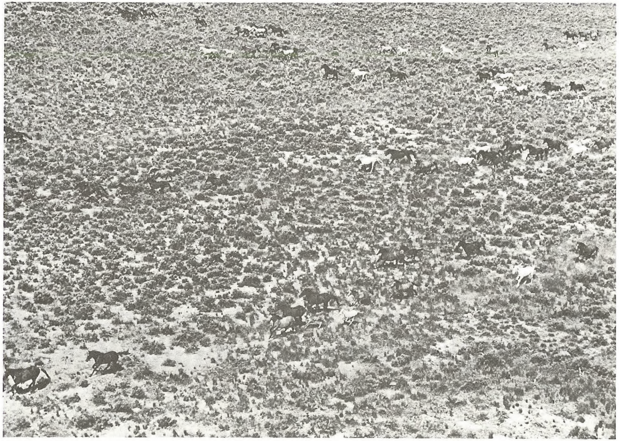


FIGURE VIII-7

WILD HORSES - SOUTHEAST OREGON

TABLE VIII-32

SUMMARY WILDLIFE DISTRIBUTION - MIDPOINT TO MALIN

ALTERNATE ROUTE III

Major Species	Midpoint to Hagerman	Hagerman to Owyhee Jnc.	Owyhee Jnc. to Catlow Jnc.	Catlow Jnc. to Sycan Flat	Sycan Flat to Malin	Total
Fish	1-	3-	2-	1-	3-	10-
Deer		3-1500	1-500	1-200	2-600	7-2800
Antelope	1-100	5- 600	4-500	4-750	1- 50	15-2000
Bighorned Sheep		1- 100	1-100			2- 200
Elk		2- 30				2- 30
Waterfowl	2-	2-	1-	3-		8-
Raptors	1-	1-	2-	2-	1-	7-
Threatened or Endangered	6-Spotted Bat Peregrine Falcon Prairie Falcon W. Ground Snake W. Snowy Plover Bald Eagle	7-Spotted Bat Prairie Falcon Peregrine Falcon W. Ground Snake W. Snowy Plover Bald Eagle Kit Fox	5-Kit Fox Prairie Falcon Peregrine Falcon W. Ground Snake W. Snowy Plover		Peregrine Falcon	
Sagegrouse Strutting Grouses		1-	1-			2-
Wild Horses		1- 40		2-500		3- 540

Shown by a number of concentrations or herds and by estimated population as possible. See actual overlays and maps for details. For example, "4-600" indicates 4 bands of antelope, etc. for a total of 600 individual animals.

ESTHETICS

The Catlow to Sycan Flat segment of Alternate Route III would extend northwesterly from the mouth of Long Hollow across the level Catlow Valley. About one mile northeast of the northeast corner of Hart Mountain National Wildlife Refuge it would turn westerly across level to rolling and broken terrain characterized by a high desert shrub-grassland vegetative type of generally low visual contrast and scenic values. It would extend across the northern topographical break of Poker Jim Ridge, a major landscape escarpment, in the vicinity of Orijana Canyon.

The segment would pass about four miles north of the Warner Lakes (Blue Joint Lake), (FIGURE VIII-8), five miles north of Lake Abert and about two miles south of Summer Lake. Near the south end of Summer Lake, it would ascend the moderately scenic 3000($\pm$) foot Winter Ridge escarpment (FIGURES VIII-9 and 10). The terrain at this point is moderately steep with the 3,000 foot elevational change extended over a distance of four to five miles. The segment would cross about one mile north of the U.S. Forest Service Slide Mountain Geologic Study Area on Winter Rim. The Winter Ridge crossing includes extensive evidence of forest fires and attendant landscape scars as a result of salvage logging operations.

From Winter Ridge on west, the route segment would cross moderately scenic National Forest lands characterized by level to gently sloping terrain and a mixed conifer vegetative type. Interspersed open areas create visual contrasts adding to the areas scenic quality (FIGURE VIII-11). It would cross the Sycan River, a moderately scenic stream canyon, and join the two existing 500 KV transmission lines near the south end of Sycan Flat. With the exception of the two transmission lines, a logging railroad and secondary forest roads, this portion of the route segment is basically free of major manmade landscape intrusions.

The route segment would cross two major transportation routes and 13 secondary routes, including seven U.S. Forest Service roads. 1973 annual daily traffic at the highway crossings was as follows:

Oregon State Route 31	520 A.D.T.
U.S. Route 395	280 A.D.T.

Scenery-sensitivity factors for the route segment are as follows:

B2	33 miles
B3	2 miles
C2	4 miles
C3	92 miles

RECREATION RESOURCES

Primary recreation uses and activities along the route segment include limited antelope hunting in the Catlow Valley area and moderate to heavy

FIGURE VIII-8

BLUE JOINT LAKE AND HART MOUNTAIN

(looking south)

FIGURE VIII-9

WINTER RIDGE

(looking west)

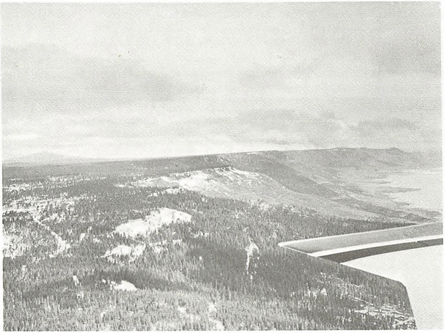


FIGURE VIII-10

WINTER RIDGE

(Looking North)

FIGURE VIII-11

NATIONAL FOREST EAST OF SYCAN

deer hunting in the National Forest area; together with general sightseeing and off-road vehicle use. The Sycan River receives light to moderate trout fishing activity.

SOCIOECONOMIC CONDITIONS

Refer to Alternate Route I and to Chapter II, Socioeconomic conditions.

Analysis of Impacts - Alternate Route III

GENERAL

Chapter IV mitigating measures would apply to Alternate Route III.

Impacts upon the environment, that would result if Alternate Route III should be constructed, upon climate, air quality, geology/topography, minerals and noise would be about the same as those described for the proposed route in Chapter III. Temporary impacts, though minor, would be of slightly longer duration because Alternate Route III would be about 30 miles longer than the proposed route. Permanent impacts on the foregoing resources would be negligible; about the same as for the applicant's proposed route.

SOILS

General impacts and assumptions for this alternate route are the same as discussed under the proposed route in Chapter III. Specific impacts are shown in TABLES VIII-33 and 34a and b.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total tonnage saved which each mitigating measure achieves. TABLE VIII-35 shows the unavoidable impact on soils. This is the net potential erosional loss on the particular soils along this alternate route after mitigation.

WATER RESOURCES

General impacts and assumptions for this alternate route are the same as discussed for the proposed route in Chapter III. Specific potential sedimentation, including the construction period, for Alternate Route III is listed in TABLE VIII-36.

There would be no impacts on ground water.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total sedimentation saved by each mitigating measure.

VEGETATION

The causes and types of impacts on the vegetative resource would be the same as described for the proposed route in Chapter III, but would vary in magnitude.

TABLE VIII- 33

POTENTIAL SOIL LOSS

ALTERNATE ROUTE III - MIDPOINT TO MALIN

Soil Map Symbol	R Value	K Value	LS Value	Potential Soil Loss (Tons/Acre/Year)
		Catlow Junction to Sycan Flat		
10	10	.34	.2	.7
8	10	.30	.1	.3
7	20	.30	.2	1.2
11	20	.21	.4	1.7
2a	20	.20	.2	.8
2c	20	.34	.2	1.4
Average Loss				1.0

TABLE VIII- 34a

NET POTENTIAL SOIL LOSS DUE TO CONSTRUCTION BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUTE III - MIDPOINT TO MALIN

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
Midpoint to Hagerman	0.12 - 0.62	1.1	65	24.0	71.5	47.5
Hagerman to Owyhee Jct.	0.62 - 1.25	1.5	293	273.9	439.5	165.6
Owyhee Jct. to Catlow Jct.	0.12 - 1.25	1.9	181	124.9	343.9	219.0
Catlow Jct. to Sycan Flat	0.62	1.0	278	172.4	278	105.6
Sycan Flat to Malin	.12 - .62 *	2.1	119	44.0	249.9	205.9
Total			936	639.3	1382.8	743.6

* Estimated

TABLE VIII- 34b

NET POTENTIAL SOIL LOSS DUE TO OPERATION AND MAINTENANCE BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUTE III - MIDPOINT TO MALIN

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net. Pot. Soil Loss T/Yr
Midpoint to Hagerman	0.12 - 0.62	1.1	22	8.1	24.2	16.1
Hagerman to Owyhee Jct.	0.62 - 1.25	1.5	140	130.9	210.0	79.1
Owyhee Jct. to Catlow Jct.	0.12 - 1.25	1.9	104	71.2	197.6	126.4
Catlow Jct. to Sycan Flat	0.62	1.0	161	99.8	161.0	61.2
Sycan Flat to Malin	.12 - .62 *	2.1	11	4.1	23.1	19.0
Total			438	314.1	615.9	301.8

* Estimated

TABLE VIII- 35

POTENTIAL RESIDUAL SOIL LOSS AFTER MITIGATION

ALTERNATE ROUTE III - MIDPOINT TO MALIN

Route Segment	Net Potential Soil Loss (Tons) 1/
Midpoint to Hagerman	853
Hagerman to Owyhee Jct.	4116
Owyhee Jct. to Catlow Jct.	6519
Catlow Jct. to Sycan Flat	3156
Sycan Flat to Malin	1156
Total	15,800

1/ The net potential loss is the erosion which takes place above the base level in the one year the soil is essentially bare plus 50 times the annual loss due to operations and maintenance. This is the unavoidable impact over the life of the project.

TABLE VIII- 36

TOTAL POTENTIAL SEDIMENT YIELD

ALTERNATE ROUTE III - MIDPOINT TO MALIN

Route Segment	Total Potential Sediment Yield From Acres Affected by Proposed Action Over 50 Years (Ac-Ft)
Midpoint to Hagerman	0.21325
Hagerman to Owyhee Jct.	1.02900
Owyhee Jct. to Catlow Jct.	1.62975
Catlow Jct. to Sycan Flat	0.78900
Sycan Flat to Malin	0.28900
Total	3.95000

Losses of vegetative cover, both temporary and permanent, are summarized in TABLES VIII-37 and 38.

In the coniferous forest type the alternate route would parallel two existing 500 KV transmission lines for about 22 miles, mainly within the Fremont National Forest. It would be immediately adjacent to the existing lines; therefore, the width of the new right-of-way would be 145 feet rather than 175 feet. The total area of coniferous forest within that width is 602 acres, of which 565 acres are commercial forest and 37 acres are low site low production forest lands.

Production on four acres of the commercial forest type would be permanently lost; 561 acres would be altered to a non-commercial forest type by permanent removal of tall growing coniferous species for the entire right-of-way width. The permanent loss of commercial forest production would be the entire 565 acres.

There would also be some degree of unavoidable increase in fire hazard, which is not quantifiable, because of increased right-of-way access.

WILDLIFE

Wildlife species and habitat types are basically the same as for the applicant's proposed route. Impacts on wildlife would be generally the same as those discussed in Chapter III; mitigating measures the same as listed in Chapter IV.

TABLE VIII-39 shows the unmitigated and the unavoidable adverse impacts (after mitigation) on wildlife.

ARCHAEOLOGICAL AND HISTORICAL VALUES

Detailed cultural surveys have not been made so specific impacts on archaeological sites and values are not known. Mitigating measures listed in Chapter IV would reduce the impact to about the same level as for the proposed route.

No known historical sites are known to exist along the Catlow to Sycan Flat route segment. Other portions of Alternate Route III, which are common to the proposed route and Alternate Route I, have been previously discussed.

LAND USE

The cause and type of impacts are the same as discussed in Chapter III for the applicant's proposed route, but there are variations in magnitude.

TABLE VIII- 37

TEMPORARY LOSS OF VEGETATIVE COVER (ONE YEAR)

ALTERNATE ROUTE III - MIDPOINT TO MALIN

Route Segment	Vegetative Type Acres					
	Desert Shrub	Grass	Juniper	Agri culture	Forest	Total
Midpoint to Hagerman	16	2	--	2	--	20
Hagerman to Owyhee	76	9	--	10	--	95
Owyhee to Catlow	62	3	--	--	--	65
Catlow to Sycan Flat	61	4	5	--	11	81
Sycan Flat to Malin	1	2	19	2	12	36
Total	216	20	24	14	23	297

Cause	Acres
Roads	233
Tower Clearings	28
Tower Footings	9
Tensioning Pads	3
Reactor Station	5
Midpoint Substation	10
Malin Substation	9
Total	297

TABLE VIII- 38

PERMANENT LOSS OF VEGETATIVE COVER

ALTERNATE ROUTE III - MIDPOINT TO MALIN

Route Segment	Vegetative Type Acres					
	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Total
Midpoint to Hagerman	11	--	--	--	--	11
Hagerman to Owyhee	14	2	--	--	--	16
Owyhee to Catlow	15	--	--	--	--	15
Catlow to Sycan Flat	12	1	--	--	2	15
Sycan Flat to Malin	--	--	11	--	2	13
Total	52	3	11	--	4	70

Cause	Acres
ORV Travel	46
Reactor Station	5
Substation	19
Total	70

TABLE VIII-39

UNAVOIDABLE ADVERSE IMPACTS ON WILDLIFE HABITAT AFTER APPLICATION OF MITIGATIVE MEASURES

ALTERNATE ROUTE III - MIDPOINT TO MALIN

	Deer Winter Range			Antelope Range			Wild Horse Range			[6] Forest Wildlife		[7] Waterfowl		[8] Raptors	New Access into Remote Area	
		Acres			Acres			Acres				By No. of Sites		By No. of Sites		
Route Segment	[1] Miles	[2] Direct	[3] Indirect	Miles	Direct	Indirect	Miles	Direct	Indirect	Miles	Acres Affected	Direct	Indirect		Miles	[3] Acres
Midpoint to Hagerman	0	0	0	18	3.6	23,000	0	0	0	0	0	1	0	1	0	0
Hagerman to Owyhee	23	4.6	29,400	26	5.2	33,300	6	1.1	3,800	0	0	1	1	1	20	25,600
Owyhee to Catlow	0	0	0	11	2.2	14,100	0	0	0	0	0	0	0	0	12	15,400
Catlow to Sycan Flat	4	.8	5,100	48	9.6	61,400	18	3.6	23,000	11.0	231	0	3	0	12	15,400
Sycan Flat to Malin	15	1.0	(5)	0	0	0	0	0	0	22.5	447	0	0	0	0	0
TOTALS	42	6.4	34,500	103	20.6	131,800	24	4.7	26,800	33.5	678	2	4	2	44	56,400

(1) Estimated miles of power line right-of-way passing through crucial big game or wild horse habitat.

(2) Based of .2 acres of vegetation permanently removed per mile of power line by ORV trail.

(3) Based on the effect of vehicles & people on animals for 1 mile on each side of trail (lineal milage x 2 x 640 acres per sq. mile).

(5) Adjacent to an existing power line right-of-way - no new indirect impacts.

(6) Based on 21 acres per mile of right-of-way (15 acres/mile from Sycan to Malin) effecting wildlife requiring old growth Forest, including snags & other dead trees.

(7&8) "Direct" means when power line crosses productive areas of migration routes or within 2 miles or less of nesting sites.
"Indirect" means when power line is close enough to adversly affect these sites.

The primary effect on grazing would be the loss of livestock forage caused by removal of vegetative cover, which is summarized in TABLE VIII-40.

TABLE VIII-40

UNAVOIDABLE LOSS OF ANIMAL UNIT MONTHS OF FORAGE
ALTERNATE ROUTE III - MIDPOINT TO MALIN

Route Segment	Temporary Loss Annual	Temporary Loss 2 Years	Permanent Loss Annual	Permanent Loss 50 Yr. Project Life
Midpoint to Hagerman	2.0	4.0	0.7	37.6
Hagerman to Owyhee	9.5	19.0	1.9	110.2
Owyhee to Catlow	5.6	11.2	1.0	59.2
Catlow to Sycan Flat	6.4	12.8	1.3	75.2
Sycan Flat to Malin	2.4	4.8	--	4.8
Total	25.9	51.8	4.9	287.0

These forage losses would be very minor to the livestock industry.

Commercial timber production would be lost on 565 acres, with an annual growth loss of 191,000 board feet. This timber volume loss would amount to $28,650 annually, based on a stumpage value of $150 per thousand board feet. It also equates to the loss of one man-year employment in the wood products industry.

Loss of timber production over a 50-year project life would amount to 9,550,000 board feet, with an accompanying loss of 50 man-years employment in the wood products industry.

Agricultural production would be lost on 14 acres during the construction period, and on 1.9 acres on a permanent basis. The permanent loss would be the area within tower bases (.015 acre per tower).

ESTHETICS

Impacts on all route segments, except the Catlow to Sycan Flat segment, have been discussed in the proposed route, Chapter III, and Alternate Route I of this Chapter. Unavoidable adverse impacts have also been previously discussed for the same segments.

Alternate Route III, Catlow to Sycan Flat, would cross U.S. Highway 95 and Oregon State Highway 31, with a total annual daily traffic of 800 vehicles. Thirteen secondary roads would also be crossed. The route segment at each highway crossing would be visible for about five miles due to the level to rolling terrain and open landscape character of the area. Visibility would be particularly pronounced under reflective light conditions.

The alternate route, as it would ascend on Winter Ridge and on across the Fremont National Forest, including the Sycan River, would represent an inharmonious natural landscape intrusion through a moderately scenic area. Visibility of the route would be increased by vegetative clearing of the mixed conifer vegetative type and the subsequent modification of natural vegetative patterns, including the creation of a tunnel effect. Visibility would be increased, particularly as the route would ascend Winter Ridge as seen from State Highway 31, during reflective light conditions. Total 1973 annual daily traffic at the State Highway 31 crossing at the base of the Winter Ridge was 520 vehicles.

The alternate route, at the base of Winter Ridge, would be situated in close proximity (1 - 2 miles) of three ranch residences. Degree of impact would vary depending upon proximity to the right-of-way and residential view orientation.

Reflective light visual impacts for the entire route segment, and particularly in the Winter Ridge and Fremont National Forest areas and all major and secondary transportation route crossings, could be lessened through use of nonspecular conductors and treated tower steel. Visual impacts on Winter Ridge could be reduced through utilization of existing roads and trails in construction and maintenance activities. Stringing the "sock line" by helicopter in the Winter Ridge and Fremont National Forest areas would reduce right-of-way clearing surface disturbance and its attendant visual impact. Location of tower structures to minimize "skyline" visibility at the Sycan River crossing would reduce the visual impact as seen from the river. Visual impacts resulting from vegetative right-of-way clearing, particularly in the Winter Ridge and Fremont National Forest area, could be reduced through application of proposed route mitigation measures. Visual impacts at all major and secondary transportation route crossings could be lessened through application of proposed route mitigating measures involving tower placement and retention of screening vegetation.

Effectiveness of mitigating measures in reducing esthetic impacts is similar to that of the proposed route.

Visual impacts are shown in TABLE VIII-41.

RECREATION RESOURCES

All alternate route segments, except for the Catlow to Sycan Falt segment of Alternate Route III, have been discussed in other sections of this report.

The Catlow to Sycan Flat route segment across the Fremont National Forest would result in some reduction in deer hunting and general sightseeing recreation quality experience. Specific visitor use data upon which to estimate the extent of impact upon this segment is not available.

TABLE VIII-41

VISUAL IMPACTS

(CATLOW TO SYCAN FLAT SEGMENT)

Proposed Power Line as Seen From:	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Unmitigated Impacts	Unavoidable Impacts
U.S. Highway 395	Highway Crossing	M	L	H	H	M
State Highway 31	Highway Crossing	M	M	H	H	M
Winter Ridge to Sycan Flat	Escarpment - Forest Crossing	M	M	H	H	M

The impact from increased deer hunting and general recreation access through the Fremont National Forest (Silver Lake Unit) would be basically identical to Alternate Route I, Walters Ferry to Sycan Flat segment.

Some increase in off-road vehicle use could occur along the remainder of the route segment.

Mitigating measures, Chapter IV, would be partially effective in lessening recreation impacts, including limiting off-road vehicle use.

SOCIOECONOMIC CONDITIONS

Since this alternative route is identical to the proposed route from Midpoint to Fields, the anticipated impacts should be quite similar along this portion of the alternative route as described in Chapter III. Anticipated impacts of the eastern portion of the route would differ somewhat from those of the proposed route. Although longer than the proposed route, this alternative would avoid apparent "sensitive" areas of high social values such as Warner Valley and Goose Lake Valley. The route would parallel an existing high voltage AC lines running north-south from the Malin substation.

This alternative route would be about 38 miles longer than the proposed route, so construction costs would be expected to be higher. Due to the increased capital investment, tax revenues would also be somewhat more than those resulting from construction of the transmission line along the proposed route. Operation and maintenance of the power line would result in basically the same impacts as the proposed route described in Chapter III. The apportionment or distribution of taxes to individual counties would differ very little.

ALTERNATE ROUTE IV

Description

Alternate Route IV (FIGURE VIII-12) is a combination of Alternate Routes I, II and III. It would be the same as the applicant's proposed route from the Midpoint substation on west across the Snake River northwest of Hagerman. Then it would be the same as Alternate Route I to the point near Walters Ferry on the Snake River, then the same as Alternate Route II southwest to the intersection with the applicant's proposed route east of Rome, Oregon. Between this point and Catlow Valley, it would be the same as Pacific's proposed route, the same as Alternate Route III through Catlow Valley and on west to Sycan Flat where it would intersect the two existing 500 KV transmission lines. From that point, it would be the same as Alternate Route I on south to the Malin substation.

This alternate route would be about 449 miles long. About 60 percent would cross national resource lands in Idaho and Oregon administered by the Bureau of Land Management; about 10 percent would cross National Forest lands administered by the U.S. Forest Service.

The same expansion of the Midpoint (10 acres) and Malin (9 acres) substations and a five acre reactor station near Fields, Oregon would be required.

This alternative would require about 1,939 towers which would occupy 29 acres. Tensioning pads would disturb about three acres, and temporary access roads about 222 acres.

Description of the Environment

As Alternate Route IV is a combination of the applicant's proposed route, Alternate Routes I, II and III, the description of the route segments have already been discussed and will not be repeated.

Analysis of Impacts

Impacts on climate, air quality, geology/topography, minerals and noise would be minor, and the same as previously discussed. Temporary impacts would be of longer duration because the alternate route would be about 58 miles longer than the proposed route.

SOILS

General impacts and assumptions for this alternate route are the same as discussed under the proposed route in Chapter III.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total tonnage saved which each mitigating measure achieves.

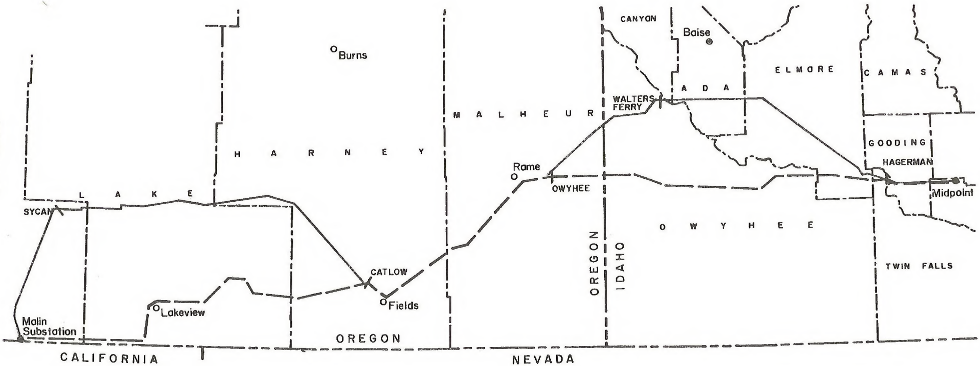


FIGURE VIII-12
Alternate Route IV
Proposed Route

Specific erosional impacts for Alternate Route IV are listed in TABLES VIII-42a and b. TABLE VIII-43 shows the unavoidable adverse impact on soils.

WATER RESOURCES

General impacts and assumptions for this alternate route are the same as discussed for the proposed route in Chapter III.

There would be no impacts on ground water.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total sedimentation prevented which each mitigating measure achieves.

TABLE VIII-44 lists specific potential sedimentation impacts for Alternate Route IV.

VEGETATION

The cause and type of impacts would be the same as discussed in Chapter III for the proposed route; they vary from the proposed route in magnitude.

Unavoidable permanent losses in vegetative cover, following mitigation (same measures as listed in Chapter IV) are summarized in TABLE VIII-45.

As in Alternate Route III, four acres of commercial forest land would be permanently lost from production and 561 acres would be altered to a non-commercial forest type by permanent removal of tall growing coniferous species.

Increased fire hazard would be the same as Alternate Route III, and unquantifiable.

WILDLIFE

Impacts on wildlife, by route segment, would be the same as previously discussed for the proposed route, Alternate Routes I, II and III.

TABLE VIII-46 is a summary of wildlife along this alternate route.

Mitigating measures would be the same as those listed in Chapter IV.

TABLE VIII-47 shows the unavoidable impacts that Alternate Route IV would have on wildlife. Since there are no known major feeding flights between Malheur Refuge and Warner Valley, there does not appear to be the danger of major collision losses to the Harvey Basin-Warner Valley flight pattern except during periods of poor visibility.

ARCHAEOLOGICAL AND HISTORICAL VALUES

Impacts would be the same as discussed for respective segments of the proposed route, Chapter III, and Alternate Routes I, II and III.

Mitigating measures would be the same as listed in Chapter IV.

TABLE VIII-42a

NET POTENTIAL SOIL LOSS DUE TO CONSTRUCTION BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUTE IV - MIDPOINT TO MALIN

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
Midpoint to Hagerman	0.12 - 0.62	1.1	65	24	71.5	47.5
Hagerman to Walters Ferry	0.12 - 9.37	1.0	222	1053.4	222	222.2
Walters Ferry to Owyhee Jct.	0.62	2.0	112	69.4	224	154.6
Owyhee Jct. to Catlow Jct.	0.12 - 1.25	1.9	181	124.9	349.9	219.0
Catlow Jct. to Sycan Flat	0.62	1.0	278	172.4	278	105.6
Sycan Flat to Malin	0.12 - 0.62	2.1	119	44.0	249.9	205.9
Total			977	1488.1	1395.3	954.8

TABLE VIII-42b

NET POTENTIAL SOIL LOSS DUE TO OPERATION AND MAINTENANCE BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUET IV - MIDPOINT TO MALIN

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
Midpoint to Hagerman	0.12 - 0.62	1.1	22	8.1	24.2	16.1
Hagerman to Walters Ferry	0.12 - 9.37	1.0	35	166.1	35.0	35.0
Walters Ferry to Owyhee Jct.	0.62	2.0	57	35.3	114.0	78.7
Owyhee Jct. to Catlow Jct.	0.12 - 1.25	1.9	104	71.2	197.6	126.4
Catlow Jct. to Sycan Flat	0.62	1.0	161	99.8	161.0	61.2
Sycan Flat to Malin	0.12 - 0.62	2.1	11	4.1	23.1	19.0
Total			390	384.6	554.9	170.3

TABLE VIII- 43

POTENTIAL RESIDUAL SOIL LOSS AFTER MITIGATION

ALTERNATE ROUTE IV - MIDPOINT TO MALIN

Route Segment	Net Potential Soil Loss (Tons) 1/
Midpoint to Hagerman	853
Hagerman to Walters Ferry	1972
Walters Ferry to Owyhee Jct.	4090
Owyhee Jct. to Catlow Jct.	6519
Catlow Jct. to Sycan Flat	3156
Sycan Flat to Malin	1156
Total	17,746

1/ The net potential loss is the erosion which takes place above the base level in the one year the soil is essentially bare plus 50 times the annual loss due to operation and maintenance. This is the unavoidable impact over the life of the project.

TABLE VIII- 44

EXISTING SEDIMENT YIELD/CALCULATED INCREASE

ALTERNATE ROUTE IV - MIDPOINT TO MALIN

Route Segment	Total Potential Sediment Yield From Acres Affected by Proposed Action Over 50 Years (Ac-Ft)
Midpoint to Hagerman	0.21325
Hagerman to Walters Ferry	0.49300
Walters Ferry to Owyhee Jct.	1.02250
Owyhee Jct. to Catlow Jct.	1.62975
Catlow Jct. to Sycan Flat	0.78900
Sycan Flat to Malin	0.28900
Total	4.43650

TABLE VIII-45

PERMANENT LOSS OF VEGETATIVE COVER

ALTERNATE ROUTE IV - MIDPOINT TO MALIN

Route Segment	Vegetative Type (acres)					
	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Total
Midpoint to Hagerman	11	--	--	--	--	11
Hagerman to Walters Ferry	6	--	--	--	--	6
Walters Ferry to Owyhee	6	2	--	--	--	8
Owyhee to Catlow	15	--	--	--	--	15
Catlow to Sycan Flat	12	1	--	--	2	15
Sycan Flat to Malin	--	--	11	--	2	13
Total	50	3	11	--	4	68

(ORV use = 44, Reactor Station = 5, Substations = 19)

As in Alternate Route III, four acres of commercial forest land would be permanently lost from production and 561 acres would be altered to a non-commercial forest type by permanent removal of tall growing coniferous species.

Increased fire hazard would be the same as Alternate Route III, and unquantifiable.

TABLE VIII-46

SUMMARY WILDLIFE DISTRIBUTION - MIDPOINT TO MALIN

ALTERNATE ROUTE IV

Major Species	Midpoint to Hagerman	Hagerman to Walters Ferry	Walters Ferry to Owyhee Jnc.	Owyhee Jnc. to Catlow Jnc.	Catlow Jnc. to Sycan Flat	Sycan Flat to Malin	Total
Fish	1-	1-	1-		1-	3-	7-
Deer		1-	1-200	1-500	1-200	2-6	6-1500
Antelope	1-100		4-750	4-400	4-750	1-50	14-2000
Bighorned Sheep							
Elk							
Waterfowl	2-		3-	2-	3-		10-
Raptors	1-		2-	2-	2-	1-	8-
Threat-ened or Endan-gered	6-Spotted Bat Peregrine Falcon Prairie Falcon W. Ground Snake W. Snowy Plover Bald Eagle	7-Spotted Bat Prairie Falcon Peregrine Falcon W. Ground Snake W. Snowy Plover Bald Eagle Kit Fox	5-Spotted Bat Prairie Falcon Peregrine Falcon W. Snowy Plover Bald Eagle	Prairie Falcon Peregrine Falcon	Prairie Falcon Peregrine Falcon W. Snowy Plover	Peregrine Falcon	
Sagegrouse Strutting Grounds		1-					1-
Wild Horses		1-40	1-260		2-500		4- 800

Shown by number of concentrations or herds and by estimated population as possible. See actual overlays and maps for details. For example, "4-600" indicates 4 bands of antelope, etc. for a total of 600 individual animals.

TABLE VIII-47

MILES AND ACRES OF WILDLIFE - HABITAT ADVERSELY AFFECTED

ALTERNATE ROUTE IV - MIDPOINT TO MALIN

Route Segment	Deer Winter Range [1]Miles	Deer Winter Range Acres [2]Direct	Deer Winter Range Acres [3]Indirect	Antelope Range Miles	Antelope Range Acres Direct	Antelope Range Acres Indirect	Wild Horse Range Miles	Wild Horse Range Acres Direct	Wild Horse Range Acres Indirect	[6]Forest Wildlife Miles	[6]Forest Wildlife Acres Affected	Waterfowl By No. of Sites [7]Direct	Waterfowl By No. of Sites [8]Indirect	Raptors By No. of Sites	New Access into Remote Acres Miles	New Access into Remote Acres Acres
Midpoint to Hagerman	0	0	0	18	36	23,000	0	0	0	0	0	1	1	1	0	0
[5] Hagerman to Walter's Ferry	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0
Walter's Ferry to Owyhee	0	0	0	0	0	0	3	6	3,800	0	0	0	0	0	10	12,800
Owyhee to Catlow	0	0	0	11	22	14,100	0	0	0	0	0	0	0	0	12	15,400
Catlow to Sycan Flat	4	.8	5,100	48	96	61,400	18	36	23,000	11.0	231	0	3	0	12	15,400
[5] Sycan Flat to Malin	15	10	(5)	0	0	0	0	0	0	22.5	447	0	1	0	0	0
TOTALS	19	1.8	5,100	77	154	98,500	21	42	26,800	33.5	678	3	5	4	34	43,600

(1) Estimated miles of power line right-of-way passing through crucial big game or wild horse habitat.

(2) Based on .2 acres of vegetation permanently removed per mile of power line by ORV trail.

(3) Based on the effect of vehicles and people or animals for 1 mile on each side of trail (Lineal mileage x 2 x 640 acres per sq. mile).

(5) Part of route is along existing power lines - no new indirect impacts.

(6) Based on 21 acres per mile of right-of-way (15 Acres, 1 mi., Sycan to Malin) affecting wildlife requiring old growth forest, snags & other dead trees.

(7) "Direct" means when power line crosses production areas of migration routes or within 2 miles or less of raptor nesting sites.
(8) "Indirect" means when power line is close enough to adversely affect these sites.

LAND USE

The cause and type of impacts would be the same as discussed in Chapter III for the proposed route. Mitigating measures would be the same as those listed in Chapter IV.

Vegetative cover would be permanently lost on 68 acres which would result in an annual loss of 4.8 animal unit months of forage. This would be caused by 44 acres of off-road vehicle trail and 24 acres occupied by substations and a reactor station. Loss of agricultural production would occur on 2.4 acres, the area within tower bases situated on agricultural lands.

Commercial timber production would be permanently lost on 565 acres, of which four acres would be cleared and 561 acres altered to a non-commercial forest type. The corresponding loss of timber production would amount to 191,000 board feet annually. With a stumpage value of $150 per thousand board feet, the annual monetary loss would be $28,650. Loss of timber production equates to the loss of one man-year employment in the wood products industry.

Loss of timber production over a 50-year project life would amount to 9,550,000 board feet, with an accompanying loss of 50-man years employment in the wood products industry.

ESTHETICS AND RECREATION

The cause and type of impacts would be the same as discussed in Chapter III. Mitigating measures would be the same as those listed in Chapter IV.

Specific impacts for Alternate Route IV have been covered in other sections, as this alternate route is a combination of alternatives, and will not be repeated. They are shown in various Tables in the Summary Analysis of the Proposed Route and Alternate Routes.

SOCIOECONOMIC CONDITIONS

The social and economic impacts for this alternative route would be almost identical to those anticipated or a result of Alternative Route I. This alternative route is about 58 miles longer than the proposed route which would increase construction costs.

ALTERNATE ROUTES - Malin to Medford

Four alternate routes between the Malin substation and the site of the proposed Medford substation were studied.

Description of Alternate Route I

This alternative would be the same as the proposed route between Malin and the Green Springs Highway, Oregon State Highway 66. From the Green Springs Highway area, it would continue northwesterly, paralleling the existing 230 KV line, passing east of Emigrant Lake, along the foothills on the east side of the valley between Ashland and Medford and on north to the proposed substation site northeast of Medford (FIGURE VIII-13). It would be visible from Interstate Highway I-5, Ashland, and other communities.

This alternate route would be about 92.5 miles long. About 21% of the lands that would be crossed are national resource lands administered by the Bureau of Land Management. No National Forest lands would be involved.

About 400 towers which would occupy six acres would be required. Tensioning pads would disturb one acre and the new Medford substation would require 12 acres.

Description of the Environment

GENERAL

Climate, air quality and mineral resources along Alternate Route I would be the same as discussed in Chapter II for the proposed route between Malin and Medford.

GEOLOGY/TOPOGRAPHY

This route would traverse the same topography and geology as discussed under the proposed route except between Green Springs and Medford. A portion of the route in this segment would traverse the Klamath Mountains. Landscape in the Klamath Mountains is characterized by strong dissected uplands with elevations up to 5,000 to 6,000 feet. The slopes are moderately steep to very steep. The bedrock is mostly metamorphased sedimentary, volcanic flows, and acid intrusives. The area has had mass wasting and many rock slides.

SOILS

The soils that would be crossed by Alternate Route I are described in TABLE VIII-48.

WATER RESOURCES

Water resources would be the same as the proposed route between Malin and Green Springs.

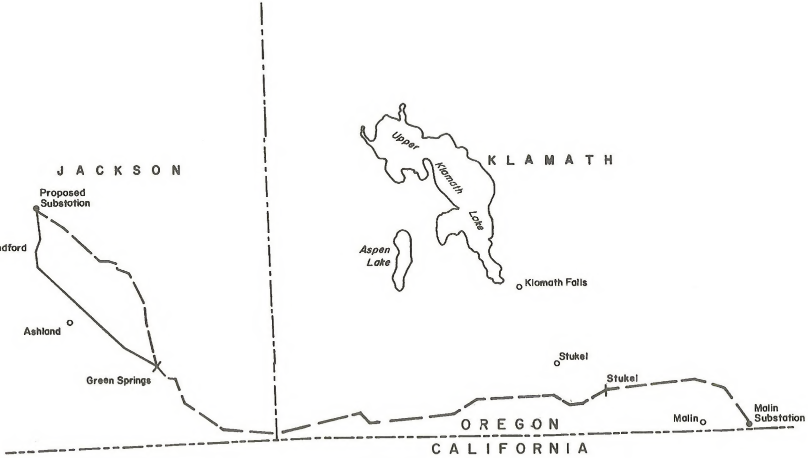


FIGURE VIII-13
Alternate Route I ————
Proposed Route — — —

TABLE VIII-48

DESCRIPTIONS OF THE SOILS TRAVERSED BY THE PROPOSED ROUTE CORRIDOR BY DEFINED SEGMENTS

ALTERNATE ROUTE I - MALIN TO MEDFORD

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water-holding Capacity	Major Soil Problems
Malin - Stukel																			
3a	4200-6000	12-16	90-120	Range	Aridic Lithic Argixerolls	Clayey, montmesic	Lorella	Uplands	Basalt	Loam	Clayey			10-20	Slow	---	Good	Very low	Stones; droughtiness
3c	4500-6500	18-25	50-90	Forest	Pachic Ultic Argixerolls	Loamy skeletal, mixed, frigid	Woodcock	Uplands	Colluvium	Stony loam	Clay loam	Stone	45	40-60	Mod	---	Well	Med	Cold temp erosion
Stukel - Green Springs																			
3c	4500-6500	18-25	50-90	Forest	Pachic Ultic Argixerolls	Loamy skeletal, mixed, frigid	Woodcock	Uplands	Colluvium	Stony loam	Clay loam	Stone	45	40-60	Mod	---	Well	Med	Cold Temp erosion
3b	4050-4200	10-14	90-120	Pasture	Xerollic Durorthids	Coarse loamy, mixed, mesic	Henley	Bottomlands	Alluvium	Loam	Loam	---	---	20-40	Mod	---	Somewhat Poor	Low	Alkalinity
1c	4800-6500	35-50	50	Woodland	Typic Xerochrepts	Loamy, skeletal, mixed frigid	Oatman	Mountainous slopes	Colluvium	Gravelly loam	Cobbly loam	Cobbles and Stones	45	40-60	Mod	---	Good	Med	Steep slopes erosion

TABLE VIII-48 (Continued)

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water-holding Capacity	Major Soil Problems
Green Springs - Medford																			
4d	2000-3500	40-60	70-100	Woodland	Ultic Haploxeralts	Fine-loamy, mixed, mesic	Freezener	Mountain Slopes	Basalt colluvium	Loam	Clay Loam	Stone	25	40-60	Mod Slow	---	Well	High	Steep Slopes Erosion
3f	1200-3500	25-60	130-160	Woodland	Typic Haploxerults	Fine-loamy, mixed, mesic	Josephine	Upland slopes	Colluvium	Loam	Clay Loam	Stone	30	20-40	Mod Slow	Good	Well	Med	Erosion

The major streams in the Green Springs to Medford segment are Bear and Emigrant Creeks. Emigrant Reservoir, with a storage capacity of 39,000 acre-feet, is in a reach of Emigrant Creek. Water quality is generally high for the backwaters of the streams. Water from Emigrant Lake is used for irrigation. Sediment yield ranges from 0.2 to 0.5 acre-feet per square mile per year.

Specific ground water data are not available for this area. This segment of the route would traverse volcanic, pyroclastic and flow rocks that have a moderately low porosity and permeability. Yield of domestic wells generally range from five to 20 gallons per minute. This is a moderate low base flow to streams.

NOISE

The area traversed by this alternate route is characterized by small, widely separated communities and sparse settlement. The majority of the lands are in public ownership. They are used primarily for grazing, agriculture, recreation and open space. The ambient noise level is very near that of nature without man or machines along most of the route.

Ambient noise level could rise where the alternate route crosses major highways, secondary roads, railroads, agricultural lands, and communities.

The ambient noise levels have not been monitored nor defined along this alternate route. However, they are presumed to be very close to those given for the proposed route.

VEGETATION

The general vegetative types found on this route are the same as described for the proposed route (see Chapter II, Malin to Medford for a description of general vegetative types).

Beginning at the Malin substation, this alternate would be the same as the proposed route for the first 69 miles, until reaching Green Springs Junction. Here it would leave the proposed route and proceed generally in a northwest direction past Emigrant Lake and roughly parallel to Freeway I-5. It would cross alternating grass and broad schlerophyll types until reaching a point roughly east of Phoenix, Oregon. From here to the proposed substation site, the prevailing type is grass or grass-oak. Relatively minor areas of agricultural land are found in the Meyer Creek and Butler Creek area.

TABLE VIII-49 summarizes the vegetative data for this alternative.

Coniferous forest is the most common type found; totaling over one-third of the route, and almost twice as much as the next most common type, grass.

Desert shrub, agriculture, and juniper are of almost equal occurrence; roughly one-eiths of the route each.

TABLE VIII-49
VEGETATIVE TYPE MILES BY ROUTE SEGMENT
ALTERNATE ROUTE I - MALIN TO MEDFORD

Route Segment	Desert Shrub	Grass	Juniper	Agri-culture	Conifer. Forest	Broad Schler.	Total
Malin to Stukel	10	1	7	--	--	--	18
Stukel to Green Springs	1.5	2	4	9	34.5	--	51
Green Springs to Medford	--	15	--	2.5	--	6	23.5
Total	11.5	18	11	11.5	34.5	6	92.5

WILDLIFE

This 92.5 mile-long alternate route would begin at Malin, and would be the same from Malin to the Green Springs summit as the proposed route. From Green Springs to Medford, the alternate route would follow an existing 230 KV line along the open foothills bordering the Rogue River Valley between Ashland and Medford. The segment from Green Springs to Medford, is composed chiefly of grasslands, interspersed with broad schlerophyll oak, poison oak, madrone and ceanothus. Most of the aspect presents a hot, dry south-facing slope. The area constitutes a blacktailed deer winter range, with an unknown number of wintering animals. Some valley quail and doves are found along this route. Broad schlerophyll habitat contains woodpeckers, the California ground squirrel and silver-grey squirrel. Other wildlife species are similar to those found on the applicant's proposed route along the Klamath River breaks from the Klamath River to the Green Springs summit. There is little or no closed canopy coniferous forest along this alternate route.

The alternate route would pass above Emigrant Reservoir near Ashland, and across the heads of several small streams draining into Bear Creek, a tributary of the Rogue River. Aquatic wildlife is similar to that listed for the applicant's proposed route along Antelope Creek.

ARCHAEOLOGICAL AND HISTORICAL VALUES

The cultural resources of the area between the Malin substation and the Green Springs summit have already been discussed in Chapter II. No investigations of prehistoric sites have been made from Green Springs to Medford. It is very possible that sites will be found where water is or has been reasonably available and where food and other resources are clustered.

No historical sites have been identified or are known to exist along the alternate route.

LAND USE

General land uses are the same as described for the applicant's proposed route; as this alternate would cross the same general type of country. It would traverse mainly forest and open range country with small communities and sparse settlement.

Grazing

This category includes those lands utilized primarily for grazing of range livestock. Such lands would comprise 46.5 route miles and 986 acres within the total right-of-way width. This amounts to slightly over 50 percent of the right-of-way area.

Grazing use is primarily by cattle. Use on federal lands is by grazing lease, and based on forage production capacity. Productivity varies widely between areas, depending on precipitation, growing season, site quality, and past use of the area. Based upon general averages for vegetative types, there are an estimated 134 AUM's of forage within the alternate right-of-way.

Forestry

Coniferous forest lands total over one-third of the route. The vast majority of these are commercial timberlands. Generally, the commercial forest zone extends from the vicinity of Hamaker Mountain to Green Springs junction.

Commercial forest lands total 639 acres with a present volume of 1,336,000 board feet. The annual growth potential is estimated at 192,000 board feet.

Agriculture

Agricultural lands total 11.5 route miles, which equals 244 acres within a 175 foot-wide right-of-way. This amounts to about 12.5% of the alternate right-of-way area. About 80% of the agricultural lands are in the Klamath Basin area. Principal crops are alfalfa, hardy grains, and potatoes. Data is not available as to acreage of various types of crops, or the acreage of irrigated land as opposed to dry land farming. However, nearly all of the agricultural lands are irrigated, primarily by ditch or flood methods.

Urban-Suburban-Industrial-Commercial

Highly developed urban-suburban-industrial-commercial areas would be avoided by the route. No urban-suburban areas would be directly traversed by the route. Following is a tabulation of communities within 3 miles of the route.

Community	Proximity
Merrill	2 miles
Worden	1 mile
Ashland	2 miles
Phoenix	3 miles

Scattered residences are found in rural agricultural areas, and also in some of the range and forest areas--particularly the area immediately east of the cities of Ashland and Medford.

Special Uses

The following special use areas as defined in the land use section of Section II would be in the vicinity of this alternate route.

Special Use	Proximity
Long Ranch Airstrip	2 miles
Buck Butte Communication Site	1 mile
Hamaker Mountain Radio Station	2 miles
Lower Klamath Wildlife Refuge	1 mile
Soda Mountain Communication Site	1 mile
Ashland Airstrip	1 mile
Roxy Ann Peak Communication Sites	1 mile

Management Framework Plans have not been completed by the Lakeview and Medford BLM districts for the area that would be crossed by Alternate Route I, Malin to Medford, so no corridors have been identified.

ESTHETICS

TABLE VIII-50 summarizes the scenery values and sensitivity classification (see Esthetics, Chapter II for explanation) of the area that would be crossed by Alternate Route I from Malin to Medford).

Alternate Route I would also have 8 secondary road crossings in Klamath County and 4 secondary road crossings in Jackson County.

Between Green Springs and Medford, Alternate Route I segment would cross State Highway 66 in three locations within a distance of approximately 1 mile, together with three secondary roads. 1973 annual daily traffic at the highway crossings is as follows:

Oregon State Route 66	770 A.D.T.

Extending northwesterly from State Highway 66, the route segment would extend along the lower foothills on the eastern edge of the Ashland-Medford valley area. Topography along the route segment consists of rolling foothill terrain with interspersed drainages extending from the Cascade Mountains to the east. Vegetation is characterized as an oak-grassland type.

The route segment would cross immediately adjacent to the east side of Emigrant Lake, an irrigation impoundment receiving moderate warm water fishing and boating use. A Jackson County Park situated at Emigrant Lake received a reported 353,200 visitor days of use in 1973.

It would pass about two miles east of Ashland and 6 miles east of Medford. Subdivision development, including many elaborate large lot residences, is rapidly encroaching into the foothill areas east of Medford and Ashland.

TABLE VIII-50

SCENERY VALUES AND SENSITIVITY CLASSIFICATION

ALTERNATE ROUTE I - MALIN TO MEDFORD

	Miles of Right-of-Way	Scenery Value/Sensitivity
	1.0	A1
	4.0	B1
	24.5	B2
	19.0	B3
	19.5	C1
	24.5	C2
Total	92.5	

TABLE VIII-51 provides annual daily traffic data, scenery values and sensitivity classification for areas where Alternate Route I would cross major highways.

TABLE VIII-51

MAJOR HIGHWAY AND ROAD CROSSINGS

ALTERNATE ROUTE I - MALIN TO MEDFORD

Crossing	Daily Traffic	Scenery Value/Sensitivity
State Highway 39	3,450	C2
U.S. Highway 97	2,250	C2
State Highway 66*	770	B1

* 3 crossings within 1 mile segment

Scenery/sensitivity factors for the route segment are as follows:

B1 - 4 miles
C1 - 19.5 miles

RECREATION RESOURCES

Recreation resources between Malin and Green Springs would be identical to those discussed for the proposed Malin to Medford route in Chapter II.

Primary recreation uses and activities along and adjacent to the Green Springs to Medford alternate route segment include boating, fishing, and other water sports at Emigrant Lake (Jackson County Park) together with limited small game hunting and general sightseeing.

SOCIOECONOMIC CONDITIONS

The socioeconomic environment described in Chapter II includes a description of Klamath and Jackson Counties, Oregon. As most of the economic and social information is compiled and published on a county basis, the socioeconomic environment would not differ from that described in Chapter II.

Analysis of Impacts

GENERAL

The impacts upon climate, air quality, geology/topography, minerals and noise would be the same as that for the proposed route (Chapter III).

SOILS

General impacts and assumptions for Alternate Route I are the same as discussed for the proposed route in Chapter III. Specific impacts are listed in TABLES VIII-52 and 53a and b.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total tonnage saved that each mitigating measure achieves. TABLE VIII-54 shows the unavoidable impact on soils. This is the net potential erosional loss on the particular soils along this route after mitigation.

WATER RESOURCES

General impacts and assumptions for this alternate route are the same as discussed under the proposed route in Chapter III. Potential sedimentation for Alternate Route I is listed in TABLE VIII-55.

There would be no impacts on ground water.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total sediment yield reduced by each mitigating measure.

TABLE VIII- 52

POTENTIAL SOIL LOSS

ALTERNATE ROUTE I - MALIN TO MEDFORD

Soil Map Symbol	R Value	K Value	LS Value	Potential Soil Loss (Tons/Acre/Year)
		Malin to Stukel		
3a	20	.33	.4	2.6
3c	20	.27	.2	1.1
Average Loss				1.8
		Stukel to Green Springs		
3c	20	.27	.2	1.1
3b	10	.27	.2	.5
1c	25	.42	3.5	36.7
Average Loss				12.7
		Green Springs to Medford		
4d	30	.36	6.3	68.0
3f	30	.36	6.3	68.0
Average Loss				68.0

TABLE VIII- 53a

NET POTENTIAL SOIL LOSS DUE TO CONSTRUCTION BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUTE I - MALIN TO MEDFORD

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
Malin to Stukel	0.12	1.8	40	4.8	72.00	67.2
Stukel to Green Springs	0.12	12.7	108	12.9	1371.6	1358.7
Green Springs to Medford	1.25 to 3.12	68.0	61	133.3	4148.0	4014.7
Total			209	151.0	5591.6	5440.6

TABLE VIII-53b

NET POTENTIAL SOIL LOSS DUE TO OPERATION AND MAINTENANCE BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUTE I - MALIN TO MEDFORD

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
Malin to Stukel	0.12	1.8	18	2.2	32.4	30.2
Stukel to Green Springs	0.12	12.7	21	2.5	266.7	264.2
Green Springs to Medford	1.25 to 3.12	68.0	13	28.4	884.0	855.6
Total			52	33.1	1183.1	1150.0

TABLE VIII-54

POTENTIAL RESIDUAL SOIL LOSS AFTER MITIGATION

ALTERNATE ROUTE I - MALIN TO MEDFORD

Route Segment	Total Potential Soil Loss (T/Yr)
Malin to Stukel	1567
Stukel to Green Springs	14,559
Green Springs to Medford	48,241
Total	64,367

TABLE VIII- 55

EXISTING SEDIMENT YIELD/CALCULATED INCREASE

ALTERNATE ROUTE I - MALIN TO MEDFORD

Route Segment	Total Potential Sediment Yield From Acres Affected by Proposed Action Over 50 Years (Ac-Ft)
Malin to Stukel	0.39175
Stukel to Green Springs	3.63975
Green Springs to Medford	12.06025
Total	16.09175

VEGETATION

The cause and type of impacts would be the same as discussed for the proposed route in Chapter III; mitigating measures would be the same as those listed in Chapter IV.

Temporary impacts that would occur during the construction period are shown in TABLE VIII-56. Permanent impacts, after mitigative measures would be applied, are shown in TABLE VIII-57.

Within the right-of-way of this alternate route, there are 639 acres of commercial forest. Five acres would be foregone to all vegetative cover because of trails and 634 acres would be altered to a non-commercial forest type by permanent removal of tall growing coniferous species. The 639 acres has an annual growth potential of 192,000 board feet, which would be lost on a permanent basis, or 9,600,000 board feet over a 50-year project life.

Increased fire hazard would be the same as discussed for the proposed route.

WILDLIFE

From Malin to Green Springs, temporary and permanent impacts on wildlife would be the same as for the proposed route. From Green Springs to Medford, as this alternate route would follow an existing power line, a minimum of vegetation would be lost and only small non-mobile ground species would be subject to loss by construction activities. The greatest impact would be the increased off-road vehicle access with corresponding increased hunting pressures and harassment on wildlife.

The loss of tall growing timber and snags along the entire alternate route would have an effect on an undetermined number of species which require old-growth timber and snags as habitat.

TABLES VIII-58 shows unavoidable adverse impacts on wildlife.

ARCHAEOLOGICAL AND HISTORICAL VALUES

Cultural values that are present may be impacted directly by disturbance or destruction through project activities (right-of-way clearance, road construction, and transmission line construction). They may also be impacted by collection and/or vandalism by crews during construction. The roads built during construction would allow people to enter into areas that are not presently accessible by vehicle, thus increasing the erosion of cultural resources by amateur collectors.

LAND USE

The cause and type of impacts would be the same for the proposed route. Mitigating measures would be the same as listed in Chapter IV.

During the construction period, because of ground disturbance, there would be a loss of 7.2 animal unit months of livestock forage. After mitigating measures would be applied, the permanent annual loss of forage production would be four animal unit months, or 200 animal unit months over a 50-year project life.

TABLE VIII-56

TEMPORARY LOSS OF VEGETATIVE COVER (ONE YEAR)

ALTERNATE ROUTE I - MALIN TO MEDFORD

Route Segment	Vegetative Type Acres						
	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Schler	Total
Malin to Stukel	12	--	7	--	--	--	19
Stukel to Green Springs	2	2	3	5	24	--	36
Green Springs to Medford	--	21	--	2	--	3	26
Total	14	23	10	7	24	3	81

Cause	Acres
Temporary Access Roads	60
Tower Clearing	6
Tower Footings	2
Tensioning Pads	1
Medford Substation	12
Total	81

TABLE VIII- 57

PERMANENT LOSS OF VEGETATIVE COVER

ALTERNATE ROUTE I - MALIN TO MEDFORD

Route Segment	Vegetative Type Acres						
	Desert Shrub	Grass	Juniper	Agri culture	Forest	Schler.	Total
Malin to Stukel	2.0	--	1.4	--	--	--	3.4
Stukel to Green Springs	0.4	0.4	0.6	--	4.8	--	6.2
Green Springs to Medford	---	13.4	--	--	--	1.0	14.4
Total	2.4	13.8	2.0	--	4.8	1.0	24.0

Cause	Acres
ORV Trails	12
Substation	12
	24

TABLE VIII- 58

UNAVOIDABLE ADVERSE IMPACTS ON WILDLIFE AND WILD HORSE HABITAT

ALTERNATE ROUTE I-MALIN TO MEDFORD

	Deer Winter Range			(6) Forest Wildlide		Waterfowl		Raptors	Wild Horse Range		
	Acres					By Number of Sites		By Number of Sites	Acres		
Route Segment	(1) Miles	(2) Direct	(3) Indirect	Miles	Acres Affected	(7) Direct	(8) Indirect	Direct	Miles	Direct	Indirect
Malin to Stukel	15	3.0	19,200	0	0	0	0	0	0	0	0
Stukel to Greensprings	21	4.2	(5) 26,900	34.5	639	1	0	0	15	3.0	19,200
Greensprings to Medford	23	4.6	(5) 29,400	0	0	0	0	0	0	0	0
TOTALS	59	11.8	75,500	34.5	639	1	0	0	15	3.0	19,200

(1) Estimated miles of power line right-of-way passing through crucial big game or wild horse habitat.

(2) Based on.2 acres of vegetation permanently removed per mile of power line by ORV trail.

(3) Based on the effect of vehicles & People on animals for 1 mile on each side of trail (Lineal mileage x 2 x 640 acres per sq. mile).

(5) Some existing jeep trails are found along the existing 230 KV line.

(6) Based on 21 acres per mile of right-of-way, affecting wildlife requiring old growth forest, including those needing snags & other dead trees.

(7) "Direct" means when power line crosses production areas or migration routes, or within 2 miles or less of raptor nesting sites.
(8) "Indirect" means when power line is close enough to adversely affect these sites.

The alteration of 639 acres of commercial forest type to a non-commercial type would result in a permanent loss of 192,000 board feet of timber annually. Based on a stumpage value of $150 per thousand board feet, the annual monetary loss would amount to $28,800. The loss of timber production also equates to the loss of one man-year employment in the wood products industry.

The loss of timber production over a 50-year project life would amount to 9,600,000 board feet, with an accompanying loss of 50 man-years employment in the wood products industry.

During the construction period, seven acres of agricultural land would be lost to production. During the operation and maintenance period, this loss would be reduced to 0.8 acres.

Residential impacts would be the same as for the proposed route; however, more residences would be affected by this alternate route. Data on the exact number is not available.

ESTHETICS

Impacts which would result from construction of Alternate Route I would be basically the same type as those of the proposed route. They would be identical between the Malin substation and Green Springs.

Alternate Route I would cross State Highway 66 in three locations within a distance of approximately 1 mile, together with three secondary roads. Total annual daily traffic at the State Highway 66 crossings is 2,310 vehicles (770 vehicles per crossing). The alternate route segment would be highly visible for a distance of approximately four to five miles in a northwesterly direction from the State Highway 66 crossings due to the route's general paralleling of the highway, terrain characteristics, and right-of-way clearing of the oak vegetative type. Visibility would be particularly pronounced under reflective light conditions. The highway crossings are preceded by an existing parallel 230 KV transmission line.

The alternate route would be highly visible from a Jackson County park at Emigrant Lake. Visibility from the lake and park would be particularly pronounced under afternoon reflective light conditions.

Jackson County park at Emigrant Lake received a reported 353,000 visitor days of use in 1973.

The alternate route segment would be visible against the foothill backdrop of the Cascade Mountains from the communities of Medford and Ashland, Interstate 5 and numerous foothill residences. Visibility would be particularly pronounced under afternoon reflective light conditions. Degree of impact would vary greatly and be highest for those residents immediately adjacent to the route.

Reflective light visual impacts for the entire route segment, and particularly in such areas as the State Highway 66 crossings, Emigrant Lake and the Medford-Ashland foothills, could be lessened through the use of non-specular conductors and treated tower steel. Stringing the "sock line" by

helicopter and prohibiting road-trail development on Highway 66 canyon slopes would reduce landscape scarring and its esthetic impact. Vegetative clearing measures for the proposed route would reduce visual impacts for the overall route segment. Tower placement and vegetative screening measures for the proposed route would further reduce visual impacts at highway and road crossings. Mitigation measures would lessen, but not eliminate, visual impacts of the route segment to the same approximate extent as for the proposed route.

Primary esthetic impacts for the Green Springs to Medford alternate route segment, rated on a relative basis of high, medium, and low, shown in TABLE VIII-59.

RECREATION RESOURCES

Impacts would be the same as the proposed route between the Malin substation and Green Springs.

Mitigative measures for the entire alternate route would be the same as those listed in Chapter IV.

The alternate route segment between Green Springs and the Medford substation site would result in a reduced recreation quality experience to some visitors at Emigrant Lake and Jackson County Park, which received an estimated 353,000 recreation visits in 1973.

Some increase in off-road vehicle use could occur along and adjacent to the route segment. The extent of this potential impact would be increased by the close proximity to the Rogue River Valley population centers, including Medford and Ashland, and numerous rural residences. Although the extent of this impact cannot be accurately estimated, it is known that a high demand for motorcycle and other off-road vehicle use areas typically exist adjacent to population centers.

SOCIOECONOMIC CONDITIONS

This alternative route differs from the applicant's proposed route only in the segment from Green Springs to the Medford substation. The overall economic and social impacts of the alternative are very similar to those expected from the proposed route. Impacts resulting from the presence of the construction crews would likely be the same as described in Chapter III for the proposed action. Paralleling the existing 230 KV power line appears to utilize existing access and is considered efficient use of land by many persons in both the power and planning fields.

However, in this case, paralleling the 230 KV with a 500 KV power line would result in a highly visible corridor. The homesites along the foothills between Ashland and Medford, both undeveloped and with an existing residence, could suffer a loss in property values. The literature suggests that on a national basis, the existence of power transmission lines across or adjacent to property tends to increase their value. In the Ashland-Medford area it appears that the choice foothills building sites would not experience any gain in value and would very probably be devalued to an undetermined extent as a direct result of the power line.

TABLE VIII-59

VISUAL IMPACTS - ALTERNATE ROUTE I

(GREEN SPRINGS TO MEDFORD SEGMENT)

Proposed Power Line As Viewed From:	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Unmitigated Impacts	Unavoidable Impacts
State Highway 66	Highway Crossing	H	M	H	H	H
State Highway 66	Highway Crossing	H	M	H	H	M
State Highway 66	Highway Crossing	H	M	H	H	M
Medford-Ashland Foothills	Partial Visibility	H	L	H	H	H

There would be no difference in the amount of tax revenues generated if the project were constructed on this alternate route nor would the distribution of revenue differ from that resulting from the proposed power line route.

Description of Alternate Route II

Alternate Route II would be the same as Pacific's proposed route between the Malin substation and a point on the southern edge of Stukel Mountain, north of Merrill, Oregon. From this point, it would swing northwest for two to three miles, then west, passing through the Klamath Hills, across U.S. Highway 97 and the Southern Pacific Railroad about five miles north of Worden, Oregon. It would continue on west into the foothills, then run northwesterly, northeast of Hamaker Mountain and north of Chase Mountain. It would cross the Klamath River about two miles south of the Highway 66 crossing, cross Highway 66 and continue on west, about one mile north of the highway to a point south of Chinquapin Mountain. It would then go northwest until it would intersect the applicant's proposed route about three miles west of Table Mountain. From this point, it would be the same as the applicant's proposed route on in to the proposed substation site northeast of Medford (FIGURE VIII-14).

This alternate route would be about 87.5 miles long. About 23% of the lands that would be crossed are administered by the Bureau of Land Management. No National Forest lands would be involved.

It would require about 379 towers which would occupy about six acres. Tensioning pads would disturb about one acre and the new Medford substation would require 12 acres.

Description of the Environment

GENERAL

Climate, air quality, geology/topography, mineral resources, water resources, noise, and archaeological and historical values would be the same as discussed in Chapter II for the proposed route between Malin and Medford.

SOILS

TABLE VIII-60 describes, by route segment, the soils that would be crossed by Alternate Route II between the Malin substation and Medford.

VEGETATION

Alternate Route II would cross the same general vegetative types as described in Chapter II for the proposed route.

Beginning at the Malin substation, this route would be the same as the proposed route for the first 18 mile segment to Stukel. Here it would turn northwest through a grass type for about two miles, then west across agricultural lands in the Lost River area to the Klamath Hills. It would continue westerly through grass and desert shrub types in the Klamath Hills. West of the Klamath Hills it would traverse agricultural lands for about four miles in the Klamath Basin. Leaving the basin and continuing west and northwest the elevation rises rapidly and the vegetation changes to juniper and then to coniferous forest north of Hamaker Mountain.

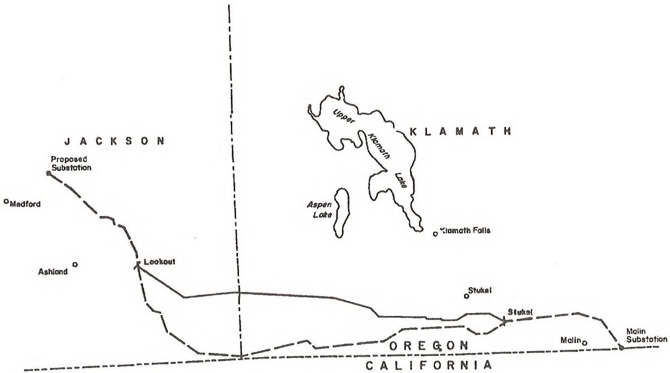


FIGURE VIII-14
Alternate Route II
Proposed Route

TABLE VIII-60

DESCRIPTIONS OF THE SOILS TRAVERSED BY THE PROPOSED ROUTE CORRIDOR BY DEFINED SEGMENTS

ALTERNATE ROUTE II - MALIN TO MEDFORD

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretation				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surfact Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water-holding Capacity	Major Soil Problems
Malin - Stukel																			
3a	4200-6000	12-16	90-120	Range	Aridic Lithic Argixerolls	Clayey, montmesic	Lorella	Uplands	Basalt	Loam	Clayey			10-20	Slow	---	Good	Very low	Stones; droughtiness
3c	4500-6500	18-25	50-90	Forest	Pachic Ultic Argixerolls	Loamy skeletal, mixed, frigid	Woodcock	uplands	Colluvium	Stony loam	Clay loam	Stone	45	40-60	Mod	---	Well	Med	Cold Temp erosion
Stukel - Lookout																			
3c	4500-6500	18-25	50-90	Forest	Pachic Ultic Argixerolls	Loamy skeletal, mixed, frigid	Woodcock	Uplands	Colluvium	Stony loam	Clay loam	Stone	45	40-60	Mod	---	Well	Med	Cold Temp erosion
3b	4050-4200	10-14	90-120	Pasture	Xerollic Durorthids	Coarse loamy, mixed, mesic	Henley	Bottomlands	Alluvium	Loam	Loam	---	---	20-40	Mod	---	Somewhat Poor	low	Alkalinity
1c	4800-6500	35-50	50	Woodland	Typic Xerochrepts	Loamy, skeletal, mixed, frigid	Oatman	Mounrainous slopes	Colluvium	Gravelly loam	Cobby loam	Cobbles and Stones	45	40-60	Mod	---	Good	Med	Steep slopes erosion

TABLE VIII-60 (Continued)

Soil Association					Classification			Position on Landscape	Soil Characteristics						Soil Qualities and Interpretations				
Map Sym.	Elevation Feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series		Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water-holding Capacity	Major Soil Problems
4d	2000-3500	40-60	70-100	Woodland	Ultic Haploxeralts	Fine-loamy, mixed, mesic	Freezener	Mountain Slopes	Basalt colluvium	Loam	Clay Loam	Stone	25	40-60	Mod Slow	---	Well	High	Steep Slopes Erosion
Lookout - Medford																			
1c	4800-6500	35-50	50	Woodland	Typic Xerochrepts	Loamy, skeletal, mixed, frigid	Oatman	Mountainous Slopes	Colluvium	Gravelly loam	Cobbly loam	Cobbles and Stones	45	40-60	Mod	---	Good	Med	Steep Slopes Erosion
4d	2000-3500	40-60	70-100	Woodland	Ultic Haploxeralts	Fine-loamy, mixed, mesic	Freezener	Mountain Slopes	Basalt colluvium	Loam	Clay Loam	Stone	25	40-60	Mod Slow	---	Well	High	Steep Slopes Erosion

Coniferous forest prevails as the route woild cross the Klamath River and proceed westerly, roughly parallel to State Highway 66. Turning northwest south of Hyatt Reservoir the route would continue through forest lands until it rejoined the applicant's proposed route at Lookout Junction. From here to the proposed Medford substation it would be the same as the proposed route.

TABLE VIII-61 summarizes the vegetative data for the alternate route.

TABLE VIII-61
VEGETATIVE TYPE MILES BY ROUTE SEGMENT
ALTERNATE ROUTE II - MALIN TO MEDFORD

Route Segment	Vegetative Type						
	Desert Shrub	Grass	Juniper	Agri-culture	Conif. Forest	Broad Schl.	Total
Malin to Stukel	10	1	7	--	--	--	18
Stukel to Lookout	3	3	4	8	33.5	--	51.5
Lookout to Medford	--	1.5	--	--	11.5	5	18
Total	13	5.5	11	8	45	5	87.5

WILDLIFE

Wildlife species and habitat for Alternate Route II are the same as discussed for the proposed route discussed in Chapter II.

ARCHEOLOGICAL AND HISTORICAL

Alternate Route II runs roughly parallel to and from two to eight miles north os the proposed route. There is no striking difference in climate, geology, topography, water resource, wildlife species, and general vegetative significant differences during the last 15,000 years. Since seven prehistoric sites were identified in the eastern part of the Siskiyou Mountain range along the proposed transmission line route, it is assumed that sites will be found along alternate route No. II in those areas that provide good access to water, and where food and other resources are clustered. There are no known historical sites along Alternate Route II.

LAND USE

General land uses are the same as described for the proposed route; as this alternate would cross the same general type of country. It would traverse mainly forest and open range country with small communities and sparse settlement.

Forestry, ranching, and agriculture are the most common economic land uses found along the route. Recreation and wildlife habitat are common and significant uses, which are covered in separate sections of this report.

Grazing

The range category includes those lands utilized primarily for grazing of range livestock. Such lands comprise 34.5 route miles and 732 acres within the total alternate right-of-way width. This amounts to almost 40 percent of the alternate right-of-way area.

Grazing use is primarily by cattle. Use on federal lands is by grazing lease, and based on forage production capacity. Productivity varies widely between areas, depending on precipitation, growing season, site quality, and past use of the area. Based upon general averages for vegetative types, there are an estimated 70 AUM's of forage within the alternate right-of-way.

Forestry

Coniferous forest lands total over one-half of the alternate route. The vast majority of these are commercial timberland. Generally the commercial forest zone extends from the vicinity of Hamaker Mountain to the vicinity of Breast Mountain.

Commercial forest lands within the alternate right-of-way total 943 acres with a present stand of 5,000,000 board feet. The annual growth potential is estimated at 377,000 board feet.

Agriculture

Agricultural lands total 8 route miles and 170 acres within the alternate right-of-way width. This amounts to about 9 percent of the total right-of-way area. They are found in the Klamath Basin area. Principal crops are alfalfa, hardy grains, and potatoes. Data is not available as to the acreage by crop type, or to irrigated vs. non-irrigated acreage. However, nearly all of the lands are irrigated.

Urban-Suburban-Industrial-Commercial

Highly developed urban-surburban-industrial-commercial areas would be avoided by the route. No urban-suburban areas would be directly traversed by the route. Following is a tabulation of communities within 3 miles of the alternate route.

Community	Proximity
Merrill	2 miles
Worden	3 miles
Keno	2 miles
Lincoln-Pinehurst	1 mile

Scattered residences are found in rural agricultural areas, and also in some of the range and forest areas--particularly the area immediately east of the cities of Ashland and Medford.

Special Use Areas

The following special use areas as defined in the Land Use section of Chapter II would be in the vicintiy of this alternate route.

Special Use	Proximity
Buck Butte Communication Site	1 mile
Stukel Mountain FAA Facility and Communication Site	2 miles
Hamaker Mountain Radar Facility	3 miles
Chase Mountain Lookout	1 mile
Parker Mountain Lookout	2 miles
Lincoln Airstrip	1 mile
Table Mountain Lookout	2 miles
Roxy Ann Peak Communication Sites	1 mile

ESTHETICS

TABLE VIII-62 summarizes the scenery values and sensitivity classification (see Esthetics, Chapter II for explanation) of the area that would be crossed by Alternate Route II from the Malin substation to Medford.

TABLE VIII-63 provides annual daily traffic data, scenery values and sensitivity classification for areas where Alternate Route II would cross major highways.

This alternate route would also have 10 secondary road corssings in Klamath County and four secondary road corssings in Jackson County.

This alternate route would be the same as the proposed route between the Malin substation and Stukel and between Lookout and Medford. These segments are discussed in Chapter II.

TABLE VIII-62

SCENERY VALUES AND SENSITIVITY CLASSIFICATION

ALTERNATE ROUTE II - MALIN TO MEDFORD

	Miles of Right-of-Way	Scenery Value/Sensitivity
	1.0	A2
	57.5	B2
	29.0	C2
Total	87.5	

TABLE VIII-63

MAJOR HIGHWAY AND ROAD CROSSINGS

ALTERNATE ROUTE II - MALIN TO MEDFORD

Crossing	Daily Traffic	Scenery Value/Sensitivity
State Highway 39	3,450	C2
U.S. Highway 97	2,250	C2
State Highway 66	610	A2

Alternate Route II between Stukel and Lookout would cross the Klamath Basin, including the Klamath Hills, about two miles north of the proposed route. The existing environment along this portion of the route segment is the same as that of the proposed route.

Extending westerly from the Klamath Basin, the route would cross moderately steep to rolling mountainous terrain with a mixed coniferous vegetative type on the north slope of Chase Mountain before reaching the Klamath River (FIGURE VIII-15). The mountainous terrain and vegetative patterns along this portion of the route segment result in moderate visual contrasts and scenic values. With the exception of secondary roads, this portion of the route is basically free of major man-made landscape intrusions.

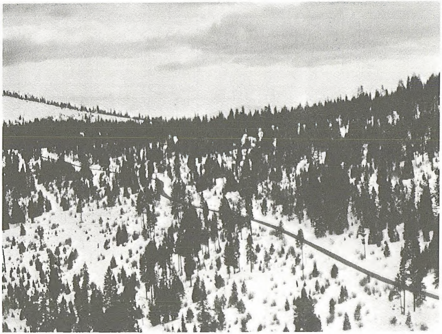


FIGURE VIII-15

NORTH SLOPE CHASE MOUNTAIN

The route would cross the scenic Klamath River near State Highway 66 approximately two miles upstream from Big Bend Reservoir and one mile downstream from the Bureau of Land Management administered Topsy Recreation Site. The route crossing of the Klamath River is characterized by gently sloping terrain and a mixed conifer vegetative type. It would parallel an existing electrical transmission line across the Klamath River.

The Klamath River receives in excess of 30,000 visitor days of trout fishing annually. The Topsy Recreation Site received an estimated 7,000 visitor days in 1974.

Extending westerly from the Klamath River, the route would parallel, on the north, State Highway 66 at a distance of one to one and one-half miles across rolling to gently sloping terrain characterized as a mixed conifer vegetative type, with extensive logging in evidence. Overall scenic values along this portion of the route segment are moderate.

The route would pass from one-half to one and one-half miles of the small settlements of Mt. View, Lincoln, Pinehurst and King Cole (FIGURE VIII-16).

The route segment would cross approximately one mile southwest of the southern extremity of Hyatt Reservoir, a developed recreation use area receiving heavy fishing, boating, water skiing and swimming use. A Bureau of Land Management administered recreation site near the southern end of Hyatt Reservoir received an estimated 75,000 visitor days of recreation use in 1973. Near the southern end of Hyatt Reservoir, it would cross the Pacific Crest Trail.

The route segment would cross three major transportation routes and seven secondary roads. 1973 annual daily traffic at the highway crossings is as follows:

State Highway 39	3,450 A.D.T.
U.S. Highway 97	2,250 A.D.T.
State Highway 66	610 A.D.T.

Scenery/sensitivity factors for the route segment are as follows:

C2 - 18.5 miles
B2 - 33.0 miles

RECREATION RESOURCES

Recreation resources between the Malin substation and Stukel and between Lookout and the Medford substation site would be the same as the proposed route.

Primary recreation uses and activities along and adjacent to the Stukel to Lookout segment of Alternate Route II include migratory waterfowl hunting-observation and warm water fishing in the Klamath Basin; sightseeing and trout

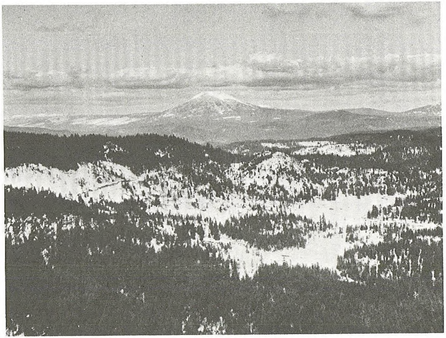


FIGURE VIII-16

VICINITY OF PINEHURST & KING COLE

fishing on the Klamath River; picnicking and camping at Topsy Recreation site; camping, picnicking, fishing, boating, swimming, and water skiing at Hyatt Lake; riding and hiking on the Pacific Crest Trail; deer hunting and general sightseeing in the forested area west of the Klamath Basin.

SOCIOECONOMIC CONDITIONS

See Chapter II, Socioeconomic Conditions and Alternate Route 1 this chapter.

Analysis of Impacts

GENERAL

Impacts upon climate, air quality, geology/topography, mineral resources, noise, and archaeological and historical values would be the same as discussed in Chapter III for the proposed route. Mitigating measures would be the same as in Chapter IV; unavoidable impacts the same as discussed in Chapter V.

SOILS

General impacts and assumptions for Alternate Route II are the same as discussed under the proposed route in Chapter III. Specific erosional impacts are listed in TABLES VIII-64 and 65a and b.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total tonnage saved that each mitigating measure achieves.

TABLE VIII-66 shows the unavoidable impacts on soils. This is the net potential soil loss on the particular soils along Alternate Route II after mitigation.

WATER RESOURCES

General impacts and assumptions for this alternate route are the same as discussed under the proposed route in Chapter III.

There would be no impacts on ground water.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total sedimentation that each mitigating measure achieves.

Potential sedimentation impacts is listed in TABLE VIII-67.

VEGETATION

The cause and type of impacts are the same as described for the proposed route in Chapter III; mitigating measures the same as in Chapter IV.

Losses of vegetative cover are summarized in TABLE VIII-68 (temporary loss during construction) and TABLE VIII-69 (permanent loss after mitigation).

TABLE VIII-64

POTENTIAL SOIL LOSS

ALTERNATE ROUTE II - MALIN TO MEDFORD

Soil Map Symbol	R Value	K Value	LS Value	Potential Soil Loss (Tons/Acre/Year)
		Malin to Stukel		
3a	20	.33	.4	2.6
3c	20	.27	.2	1.1
Average Loss				1.8
		Stukel to Lookout		
3c	20	.27	.2	1.1
3b	10	.27	.2	.5
1c	25	.42	3.5	36.7
Average Loss				12.7
		Lookout to Medford		
1c	30	.42	3.5	44.1
4d	30	.37	7.5	83.2
Average Loss				63.6

TABLE VIII-65a

NET POTENTIAL SOIL LOSS DUE TO CONSTRUCTION BY RIGHT OF WAY SEGMENT

ALTERNATE ROUTE II - MALIN TO MEDFORD

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
Malin to Stukel	0.12	1.8	40	4.8	72.0	67.2
Stukel to Lookout	0.62	12.7	109	67.6	1384.3	62.4
Lookout to Medford	0.12 - 0.62	63.6	50	18.5	3180.0	3161.5
Total			199	90.9	4636.3	3291.1

TABLE VIII-65b

NET POTENTIAL SOIL LOSS DUE TO OPERATION AND MAINTENANCE BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUTE II - MALIN TO MEDFORD

Route Segment	Range in Existing Soil Loss T/Ac/Yr	Average Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
Malin to Stukel	0.12	1.8	18	2.2	32.4	30.2
Stukel to Lookout	0.62	12.7	52	32.2	660.4	628.2
Lookout to Medford	0.12 - 0.62	63.6	32	11.8	2035.2	2023.4
Total			102	46.3	2728.0	2681.8

TABLE VIII-66

POTENTIAL RESIDUAL SOIL LOSS AFTER MITIGATION

ALTERNATE ROUTE II - MALIN TO MEDFORD

Route Segment	Total Potential Soil Loss (Tons)
Malin to Stukel	1567
Stukel to Lookout	31,462
Lookout to Medford	104,311
Total	137,340

TABLE VIII-67

EXISTING SEDIMENT YIELD/CALCULATED INCREASE

ALTERNATE ROUTE II - MALIN TO MEDFORD

Route Segment	Total Potential Sediment Yield From Acres Affected by Proposed Action Over 50 Years (Ac-Ft)
Malin to Stukel	0.39175
Stukel to Lookout	7.86550
Lookout to Medford	26.07775
Total	34.33500

TABLE VIII- 68

TEMPORARY LOSS OF VEGETATIVE COVER (ONE YEAR)

ALTERNATE ROUTE II - MALIN TO MEDFORD

Route Segment	Vegetative Type (acres) Desert Shrub	Grass	Juniper	Agri-culture	Forest	Broad Schler.	Total
Malin to Stukel	12	--	7	--	--	--	19
Stukel to Lookout	3	2	3	3	35	--	46
Lookout to Medford	--	12	--	--	14	5	31
Total	15	14	10	3	49	5	96

Cause	Acres
Temporary Roads	75
Towers	6
Tower Footings	2
Tensioning Pads	1
Medford substation	12
	96

Within a 175 foot wide right-of-way along Alternate Route II there are 943 acres of commercial forest type. Nine acres of the total would be lost to vegetative production as a result of tower sites and off-road vehicle trail. The remaining 934 acres would be altered to a non-commercial forest type by permanent removal of tall growing coniferous species. This 943 acres has a present timber volume of 5,000,000 board feet; annual growth potential is 377,000 board feet. Loss of timber production over a 50-year project life would amount to 18,850,000 board feet.

TABLE VIII-69

PERMANENT LOSS OF VEGETATIVE COVER

ALTERNATE ROUTE II - MALIN TO MEDFORD

Route Segment	Vegetative Type Acres						
	Desert Shrub	Grass	Juniper	Agri-culture	Forest	Schler.	Total
Malin to Stukel	2.0	--	1.4	--	--	--	3.4
Stukel to Lookout	0.6	0.4	0.6	--	6.6	--	8.2
Lookout to Medford	--	12.0	--	--	2.4	1.0	15.4
Total	2.6	12.4	2.0	--	9.0	1.0	27

(ORV Trail = 15 acres, Substation = 12 acres)

WILDLIFE

Impacts on wildlife species and mitigations in general are the same for this alternate route as for the proposed route. As the route would pass through dense timber stands of fir and pine, such species as the northern spotted owl, goshawk, and tree cavity-dwelling wildlife would be more subjected to loss of habitat and harassment through construction activities than would the same species along the proposed route in this area. A total of 943 acres of timberlands would be lost to species requiring snags and closed canopy forests. These impacts cannot be mitigated, and are unavoidable. On the other hand, mule deer wintering along the Klamath breaks would not be harassed by this route, as compared to the applicant's proposal. Otherwise, impacts and mitigations and unavoidable adverse impacts are similar to those of the applicant's proposed route.

TABLE VIII-70 shows shows unavoidable impacts, after mitigation.

TABLE VIII - 70

UNAVOIDABLE ADVERSE IMPACTS ON WILDLIFE HABITAT

ALTERNATE ROUTE II - MALIN TO MEDFORD

	Deer Winter Range Acres			(6) Forest Wildlife		(7) Waterfowl By Number of Sites		(8) Raptors By Number of Sites		Wild Horse Range Acres		
Route Segment	(1) Miles	(2) Direct	(3) Indirect	Miles	Acres Affected	Direct	Indirect	Direct	Indirect	Miles	Direct	Indirect
Malin to Stukel	15	3.0	19,200	0	0	0	0	0	0	0	0	0
Stukel to Lookout Mtn.	0	0	0	33.5	724	1	0	1	0	0	0	0
Lookout Mtn. to Medford	15	3.0	19,200	11.5	242	0	0	0	0	0	0	0
TOTALS	30	6.0	38,400	45.0	966	1	0	1	0	0	0	0

(1) Estimated miles of power line right-of-way passing through crucial big game or wild horse habitat.

(2) Based on .2 acres of vegetation permanently removed per mile of power line by ORV trail.

(3) Based on the effect of vehicles & people on animals for 1 mile on each side of road (Lineal mileage x 2 x 640 acres per sq. mile).

(6) Based on 21 acres per mile of right-of-way affecting wildlife requiring old growth forest, including those needing snags and other dead trees.

(7) (8) "Direct" means when power line crosses production areas or migration routes, or within 2 miles or less of raptor nesting sites. "Indirect" means when power line is close enough to adversely affect these sites.

ARCHEOLOGICAL AND HISTORICAL

Alternate Route II - Analysis of Impacts

Cultural values that are present may be impacted directly by disturbance or destruction through project activities (right-of-way clearance, road construction, and transmission line construction). They may also be impacted by collection and/or vandalism by crews during construction. The roads built during construction will allow people to enter into areas that are not presently accessible by vehicle, thus increasing the erosion of cultural resources by amateur collectors.

LAND USE

The cause and type of impacts would be the same as for the proposed route; mitigative measures would be the same as listed in Chapter IV.

Should construction take place on this alternate route, a vegetative forage loss of 5.5 animal unit months would occur during the construction period; after mitigative measures would be applied, the permanent annual loss would be reduced to 3.4 animal unit months of forage.

Because of tower sites, off-road vehicle trail and alteration of commercial forest type to a non-commercial type an annual timber loss of 377,000 board feet, which equates to the loss of two-man years employment in the wood products industry, would occur on 943 acres. Annual monetary loss, based on a stumpage value of $150 per thousand board feet, would amount to $56,550.

During the construction period, there would be a temporary loss of agricultural production on three acres; this would be reduced, after mitigation, to .1 acre on a permanent basis.

Impacts on residential use, although data as to the exact number is not known, would be greater along this alternate route than for the proposed route as more residences exist in the proximity to it.

ESTHETICS

Impacts along this proposed route from Malin on through the Klamath Basin would be basically identical to those of the proposed route; from Lookout to Medford they would be identical.

Alternate Route II would cross three major transportation routes (U.S. Highway 97 and State Highways 39 and 66) with a total annual daily traffic of 6,310 vehicles, together with seven secondary roads. Visual impacts at the State Highway 39 and U.S. Highway 97 crossings are basically identical to the proposed route. The route segment would be highly visible from the State Highway 66 crossing for a distance of one mile easterly, including the crossing of Klamath River, and two miles westerly. Visibility would be increased by right-of-way clearing of the conifer vegetative type and would be more pronounced under reflective light condition.

The Klamath River crossing would result in an inharmonious landscape intrusion across a highly scenic recreation use area. The Klamath River receives in excess of 30,000 recreation visits annually, primarily fishing use. This includes 7,000 visitor days at Topsy Recreation site in 1974.

The route would be partially visible from State Highway 66 and the settlements of Pinehurst, Mt. View and King Cole. Visibility would be increased through clearing of the coniferous vegetative type, with the subsequent modification of the natural vegetative pattern, creating a tunnel effect. Annual daily traffic at the route crossing of Highway 66 is 610 vehicles.

The alternate route would be visible as it would cross the secondary road leading from State Highway 66 to Hyatt Reservoir, a major recreation use area. Visibility would be increased through right-of-way clearing of the coniferous vegetative type. Visibility would be more pronounced under reflective light conditions.

The impact resulting from crossing the Pacific Crest Trail would be identical to that of the proposed route.

Reflective light visual impacts for the entire route segment, and particularly in such areas as Klamath River crossing, Pacific Crest Trail crossing, could be lessened through use of non-specular conductors and treated tower steel. Vegetative clearing measures for the proposed route would reduce visual impacts for this overall route segment. Visual impacts at the Klamath River crossing could be lessened by locating towers as far from the river as possible and through retaining of maximum screening vegetation. Visual impacts at the Pacific Crest Trail crossing could be lessened through application of proposed route trail crossing measures. Mitigation measures would lessen, but not eliminate, visual impacts of the route segment to the approximate extent as the proposed route.

Major esthetic impacts are shown in TABLE VIII-71 as follows, using a relative rating of high (H), medium (M) and low (L):

RECREATION RESOURCES

Impacts on recreation resources that would result if Alternate Route II should be constructed would be identical to the proposed route between the Malin substation and Stukel and also between Lookout and Medford. Impacts that would result in the Stukel to Lookout segment of Alternate Route II would be basically identical to those of the proposed route between Stukel and Green Springs.

SOCIOECONOMIC CONDITIONS

This alternative to the proposed route for the 500 KV power line would produce economic and social impacts very similar to those which would be expected as a result of constructing the power line along the proposed route. No major differences in economic or social impacts between this alternative and the proposed route are apparent. Paralleling State Highway 66 with the power line could reduce the scenic value of the area as well as possibly limiting the value of some lands for commercial or residential development.

TABLE VIII-71

ESTHETIC IMPACTS - ALTERNATE ROUTE II

Proposed Power Line As Viewed From:	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Unmitigated Impacts	Unavoidable Impacts
U.S. Highway 97	Highway Crossing	M	L	H	H	M
State Highway 39	Highway Crossing	M	L	H	H	M
State Highway 66	Highway Crossing	M	H	H	H	H
Klamath Basin	Valley Crossing	M	L	H	H	M
Klamath River	River Crossing	M	H	H	H	M
Parallel State Hwy. 66	Partial Visibility	M	M	M	M	L
Pacific Crest Trail	Trail Crossing	H	M	H	H	M

The tax revenues generated by constructing the power line on this alternative route would be a little less than would result from the proposed route since this route is about 4.5 miles shorter. Considering total costs, the difference would be insignificant (probably less than $3,000 annual tax compared to an estimated total tax revenue of about $412,000).

Description of Alternate Route III

This alternative would be the same as the applicant's proposed route from the Malin substation on west for about 21.5 miles to a point in the southeastern portion of the Klamath Hills. It would then go northwesterly through the Klamath Hills, to the west of the ridge line, to the northwest extremity of the hills. It would then go north through Spring Lake Valley to a point just east of U.S. Highway 97 and southeast of the highway bridge over the Klamath River. At this point, it would swing northwesterly, crossing U.S. Highway 97 just south of the bridge, cross the Klamath River to the east of the Weyerhaeuser saw mill to a point southeast of the Fairhaven area. At that point it would angle southwesterly between the Green Springs Highway (State Highway 66) and the existing Weyerhaeuser private road, cross just south of Keno and join the existing 230 KV powerline just to the west of Keno.

It would then follow the existing powerline westerly for about 5½ miles to a point near the Green Springs Highway where it would join alternate route II. (Figure VIII-17)

Total length of this proposed alternate route is approximately 97 miles. About 406 towers would be required, occupying about 6 acres. Tensioning pads would disturb about one acre.

Description of the Environment

Climate, air quality, geology/topography, mineral resources, water resources and noise would be the same as discussed in Chapter II for the proposed route and Chapter VIII, Alternate Route I, between Malin and Medford.

SOILS

TABLE VIII-72 describes the soils that would be crossed by Alternate Route III between the Malin substation and Medford.

VEGETATION

Beginning at Malin, this route would be the same as the applicant's proposed route for a distance 21.5 miles to a point in the south portion of the Klamath Hills. Here it would turn northwest through desert shrub for some 3 miles and grass for 1 mile before entering agricultural lands in the Klamath Basin. Continuing northwest and north until it would turn west and cross the Klamath River, it would go through agricultural lands for about 5 miles, as it would cross the river and turn southwest, about 1 mile of nonvegetated developed land would be crossed. Agricultural lands again resume, and prevail until the route would again turn westerly and cross the Klamath River. A short segment of juniper would be crossed, and then the route would enter the coniferous forest type. This forest type prevails for 6 miles to the point where this alternate would join Alternate Route II. From this point to Medford, it would be the same as Alternate Route II.

Vegetative type data is summarized in TABLE VIII-73.

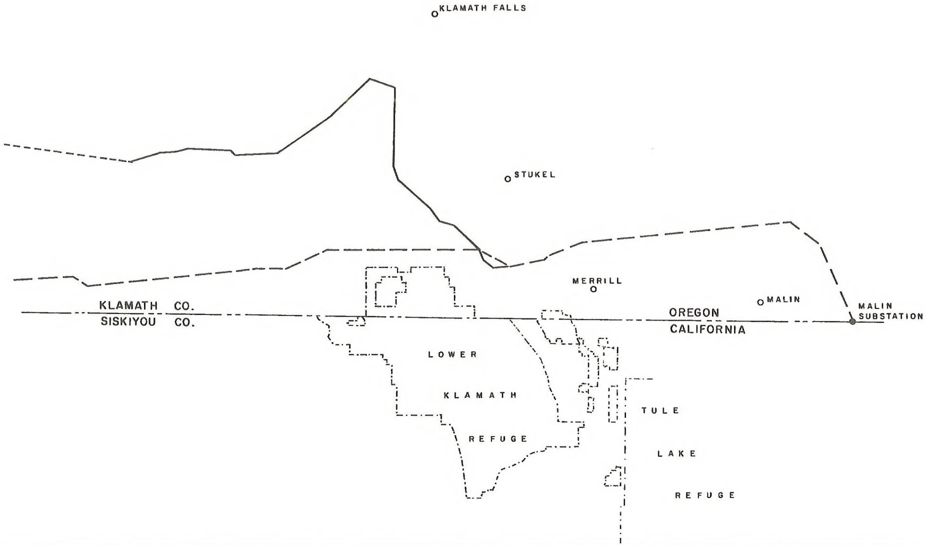


FIGURE VIII - 17

Alternate Route III ———

Praposed Raute — — —

Alternate Route II - - - - - -

TABLE VIII-72

DESCRIPTIONS OF THE SOILS TRAVERSED BY THE PROPOSED ROUTE CORRIDOR BY DEFINED SEGMENTS

ALTERNATE ROUTE III - MALIN TO MEDFORD

Soil Association					Classification			Soil Characteristics							Soil Qualitites & Interpretation				
Map Sym.	Elevation feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series	Position on Landscape	Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water-holding Capacity	Major Soil Problems
3a	4200-6000	12-16	90-120	Range	Aridic Lithic Argixerolls	Clayey, montmesic	Lorella	Uplands	Basalt	Loam	Clayey			10-20	Slow	--	Good	Very low	Stones; droughtiness
3c	4500-6500	18-25	50-90	Forest	Pachic Ultic Argixerolls	Loamy Skeletal, mixed, frigid	Woodcock	Uplands	Colluvium	Stony loam	Clay loam	Stone	45	40-60	Mod	--	Well	Med	Cold Temp erosion
1c	4800-6500	35-50	50	Woodland	Typic Xerochrepts	Loamy, skeletal, mixed, frigid	oatman	Mountainous slopes	Colluvium	Gravelly loam	Cobby loam	Cobbles and stones	45	40-60	Mod	--	Good	Med	Steep slopes erosion
4d	2000-3500	40-60	70-100	Woodland	Ultic Haploxeralts	Fine-loamy, mixed, mesic	Freezener	Mountain slopes	Basalt colluvium	Loam	Clay loam	Stone	25	40-60	Mod slow	--	Well	High	Steep Slopes Erosion

Table VIII-73

Vegetative Route Miles

Alternate Route III - Malin to Medford

Vegetative Type	Route Miles
Desert Shrub	14.
Grass	4.5
Juniper	8.
Agricultural	17.
Coniferous Forest	44.5
Broad Scherophyll	5.
Non-Vegetated	1.
Total	94.

WILDLIFE

Alternate Route III would follow the applicant's proposed route to the south end of the Klamath Hills, then swing northwesterly through the Klamath Hills, across Spring Lake Valley, to the Klamath River near the U.S. 97 Highway ridge across from Weyerhaeuser's mill, then turn northwesterly across the mill grounds and then parallel Highway 66 to Keno. There it would cross the Klamath River and follow an existing power line westerly to the junction with Alternate Route II west of the Keno Power plant and dam.

After leaving the proposed route near Dodd's Hollow, the alternate route would pass through the Klamath Hills resident mule deer herd of 50 to 60 animals, and through a BLM/Department of Fish and Wildlife cooperative public hunting area. Chukers and other upland game birds are also found in the Klamath Hills. From Spring Lake Valley to the Klamath River lies a marshy area interspersed with marginal farmlands and used by upland game and waterfowl. In the vicinity of the Klamath River, the power line would bisect an unknown number of waterfowl feeding flights and major migration routes. However, their flights would be primarily parallel to the alternate power line route from the south end of the Klamath Hills until it turns west at the Klamath River. Overall, the line would not present a direct barrier to migrating birds except for the short distance (½ mile) where it would cross the river near the Weyerhaeuser Mill. The alternate route across the Klamath River would pass within 1 mile of the upstream end of the Miller Island Wildlife Management Area, a public hunting ground and refuge operated by the Oregon Department of Fish and Wildlife. From Keno west to the Keno power plant, the alternate route would go across the north side of Chase Mountain through a small resident deer herd of unknown density (Department of Fish and Wildlife, per. comm.) From near the Keno dam and power plant the route to Medford would follow Alternate II. See description for the proposed route for fish. There are no anadromous fish in this portion of the Klamath River.

ARCHEOLOGICAL AND HISTORICAL VALUES

The line along the top of the Klamath Hills has been scrutinized for cultural resources from a helicopter. In addition, some cultural resources reconnaisance of the area has been done.

Neither of the above surveys can be viewed as exhaustive in any sense; however, neither produced any indication of cultural values. It is possible that the intensive inventory that would be done prior to surface disturbance would produce some evidence of man's past activities, but none have been found to the present time.

The rest of this alternate route lies in areas where man's recent activities have already disturbed the earth's surface in ways that probably would be destructive to any cultural values.

Much of Spring Valley has been used for agricultural purposes. The area surrounding the Weyerhaeuser mill has been developed as an industrial and residential area. The line from Keno to the Green Springs Highway

follows an already existing 230 kV line. Any cultural values once present can be expected to have been damaged or totally destroyed. The intensive survey done prior to surface disturbance may identify some remaining resources, but these very probably have lost much of their value through prior damage.

LAND USE

General land uses are the same as described for the applicant's proposed route, as this route would generally cross the same type of forest and range country, characterized by sparse settlement and small communities. An exception is the area southwest of Klamath Falls, where rural residential and industrial uses are found.

Grazing

Lands utilized primarily for grazing of domestic livestock total 31.5 route miles, and 669 acres within the total right-of-way width (about 1/3 of the total right-of-way). Use is primarily by cattle. Productivity varies widely between areas and/or vegetative types. Based on general averages for vegetative types, there are an estimated 65 animal unit months of forage within the total right-of-way area.

Forestry

Forest lands comprise almost one-half of the total right-of-way, and production of forest products is the major economic land use in the vicinity of this alternate route. There are 934 acres of commercial forest lands within the right-of-way with an estimated present volume of 5,000,000 board feet, and an annual growth potential estimated at 373,000 board feet. The commerical forest zone extends generally from the vicinity of Chase Mountain to the vicinity of Breast Mountain.

Agriculture

Agriculture lands comprise approximately 360 acres (17 route miles) within the total right-of-way width. This is about 18 percent of the right-of-way. These lands are found in the Klamath Basin area, and are mainly devoted to pasture use. Data is not available as to acreage by crop type or crop yields.

Urban-Suburban-Industrial-Commercial

Highly developed urban-suburban areas would be generally avoided by this alternate route. In the area southwest of Klamath Falls the route would cross a short segment of industrial land use (near the Weyerhaeuser Mill), and rural residential use areas would be in the line vicinity. Following is a tabulation of communities within 3 miles of this alternate route.

Community	Proximity
Merrill	2 miles
Medland	1½ miles
Klamath Falls-Altamont	3 miles
Keno	1 mile
Lincoln-Pinehurst	1 mile

Special Use Areas

The following special use areas, as defined in the land use section of Chapter II, would be in the vicinity of this route.

Special Use	Proximity
Buch Butte Communication Site	1 mile
Stubel Mtn. FAA Facility	2 miles
Klamath Falls Airport - Kinply Air Base	3 miles
KLAD Radio Tower	2 miles
Miller Island State Wildlife Management Area	1 mile
Chase Mountain Lookout	2 miles
Parker Mountain Lookout	2 miles
Lincoln Airstrip	1 mile
Table Mountain Lookout	2 miles
Roxy Ann Peak Communication Site	1 mile

ESTHETICS

Table VIII-74 summarizes the scenery values and sensitivity classification (see Esthetics, Chapter II for explanation) of the area that would be crossed by Alternate Route III from Malin to Medford.

TABLE VIII-74

SCENERY VALUES AND SENSITIVITY CLASSIFICATION

ALTERNATE ROUTE III - MALIN TO MEDFORD

Miles of Right-of-Way	Scenery Values/Sensitivity
1.0	A2
58.0	B2
32.5	C2
2.5	C3
Total 94.0	

Table VIII-75 provides annual daily traffic data, scenery values and sensitivity classification for locations where Alternate Route III would cross major highways.

TABLE VIII-75

MAJOR HIGHWAY AND ROAD CROSSINGS

ALTERNATE ROUTE III - MALIN TO MEDFORD

Crossing	Daily Traffic	Scenery Value/Sensitivity
State Highway 39	3,450	C2
U.S. Highway 97	2,500	C3
State Highway 66*	610	C2
State Highway 66	610	A2

* 2 crossings within less than 1 mile

Alternate Route III would also cross 17 secondary roads in Klamath County and 4 secondary roads in Jackson County.

Alternate Route III, upon leaving the proposed route 21.5 miles west of the Malin Substation would extend in a northwesterly direction through the Klamath Hills, a rolling foothill - scattered juniper area situated within the otherwise level Klamath Basin (Figure VIII-18).

From the northeast extremity of the Klamath Hills the route would extend in a northerly direction across the Klamath Basin, an area characterized by pasture land and rural residential development (Figure VIII-19).

It would cross the Klamath River and U.S. Highway 97 near the Weyerhaeuser lumber mill approximately 3 miles south of Klamath Falls, Oregon. The Klamath river crossing area is characterized by extensive industrial and urban development including lumber mills, highways, railraods and related developemnt (Figure VIII-20).

Upon crossing U.S. Highway 97 and the Klamath River the route would extend in a southwesterly direction, parallel to State Highway 66 at a distance generally ranging from ¼ to ½ mile, across generally level agriculture and pasture land. The route would pass immediately adjacent to the Weyerhaeuser lumber mill after crossing the Klamath River and U.S. Highway 97 (Figure VIII-21).

The route would cross the Klamath River for a second time approximately ¼ mile south of the community of Keno, Oregon. It would cross State Highway 66 approximately ½ mile southwest of Keno and again approximately 1 mile west of Keno before paralleling an existing 230 kV transmission line across the northern slope of Chase Mountain. The southern slope of Chase Mountain is a moderately scenic (Class B) area characterized by undulating broken terrain and a coniferous vegetational type. The existing 230 kV transmission line right-of-way clearing on the northern slope of Chase Mountain represents a significant lineal landscape intrusion conflicting with natural vegetative patterns.

The route would parallel the existing 230 KV transmission line across the Klamath River before connecting with Alternate Route II approximately ¼ mile west of the Klamath River near State Highway 66.

RECREATION RESOURCES

Recreation resources between the Malin substation and the southern extremity of the Klamath Hills would be the same as the proposed route.

Recreation resources between the Klamath Hills and Lookout are basically identical to those described for Alternate Route II. This alternate route in the Klamath Basin area would extend through the Klamath Hills, an area receiving generally light upland game bird and deer hunting.

Recreation resources between Lookout and the Medford substation site are the same as the proposed route.

FIGURE III-18

KLAMATH HILLS

Alternate Route III would extend through the central portion of the Klamath Hills

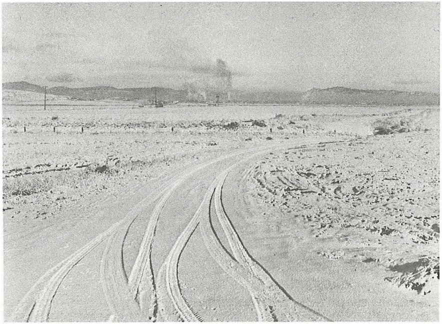


FIGURE VIII-19

KLAMATH BASIN

Alternate Route III would extend toward Weyerhaeuser mill, in background.

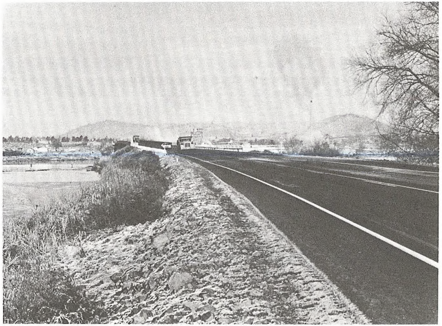


FIGURE VIII-20

U.S. HIGHWAY 97 AND KLAMATH RIVER

FIGURE VIII-21

WEYERHAEUSER LUMBER MILL LOOKING FROM

MILLER ISLAND WILDLIFE MANAGEMENT AREA.

Alternate Route III would pass between mill and hills in background.

SOCIOECONOMIC CONDITIONS

The socioeconomic conditions described in Chapter II include a description of seven Idaho and six Oregon counties potentially affected or traversed by the proposed project. Since most of the information has been compiled and published on a county basis, the description of the social and economic environment was done on a county-wide basis. Therefore, the socioeconomic conditions for Alternate Route III would be the same as those for the proposed route described in Chapter II.

Analysis of Impacts

GENERAL

The impacts upon climate, air quality, geology/topography, minerals, and noise would be the same as that for the proposed route (Chapter III).

SOILS

General impacts and assumptions for Alternate Route III are the same as discussed under the proposed route in Chapter III. Specific erosional impacts are listed in TABLES VIII-76 and VIII-77 and 77a.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of total tonnage saved that each mitigating measure achieves.

TABLE VIII-78 shows the unavoidable impacts on soils. This is the net potential soil loss on the particular soils along Alternate Route III after mitigation.

WATER RESOURCES

General impacts and assumptions for this alternate route are the same as discussed under the proposed route in Chapter III.

There would be no impacts on ground water.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total sedimentation that each mitigating measure achieves.

Potential sedimentation impacts is listed in TABLE VIII-79.

TABLE VIII-76

POTENTIAL SOIL LOSS

ALTERNATE ROUTE III - MALIN TO MEDFORD

Soil Map Symbol	R Value	K Value	LS Value	Potential Soil Loss (Tons/Acre/Year)
Malin to Jct. of Alternate III (A)				
3a	20	.33	.4	2.6
3c	20	.27	.2	1.1
Average Loss				1.8
Jct. Alternate III and proposed to Junction Alt. III and II (B)				
1c	25	.42	3.5	36.7
Average Loss				12.7
Jct. Alternate III and III to Medford (C)				
4d	30	.37	7.5	83.2
Average Loss				63.6

TABLE VIII-77

NET POTENTIAL SOIL LOSS DUE TO CONSTRUCTION BY RIGHT OF WAY SEGMENT

ALTERNATE ROUTE III - MALIN TO MEDFORD

Route Segment	Existing Soil Loss T/Ac/Yr	Average Potential Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
(A)	0.12	1.8	48.	5.8	86.4	80.6
(B)	0.62	12.7	62	38.4	787.4	749.0
(C)	0.12 - 0.62	63.6	101	25.3	6423.6	6398.3
Total			211	69.5	7297.4	7227.6

TABLE VIII-77a

NET POTENTIAL SOIL LOSS DUE TO OPERATION AND MAINTENANCE BY RIGHT-OF-WAY SEGMENT

ALTERNATE ROUTE III - MALIN TO MEDFORD

Route Segment	Existing Soil Loss T/Ac/Yr	Average Potential T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
(A)	0.62	1.8	23	14	41	27
(B)	0.62	12.7	27	!7	343	326
(C)	0.12 - 0.62	63.6	43	11	2735	2724
Total			93	42	3119	3077

TABLE VIII-78

POTENTIAL RESIDUAL SOIL LOSS AFTER MITIGATION

ALTERNATE ROUTE III - MALIN TO MEDFORD

Route Segment	Total Potential 1/ Soil Loss (Tons)
(A)	1,377
(B)	16,547
(C)	138,311
Total	156,235

1/ The total potential soil loss is the erosion which takes place in one year that the soil is bare due to construction plus 50 times the net potential soil loss due to operation and maintenance.

TABLE VIII-79

EXISTING SEDIMENT YIELD/CALCULATED INCREASE

ALTERNATE ROUTE III - MALIN TO MEDFORD

Route Segment	Total Potential Sediment Yield From Acres Affected by Proposed Action Over 50 Years (Ac-Ft)
(A)	0.35075
(B)	4.19850
(C)	35.10575
Total	39.65500

VEGETATION

Temporary loss of vegetative cover would occur due to clearing for roads, towers, tensioning pads, and a new substation. A permanent loss of vegetative cover would be due to the area necessary for the substation, and to the increased ORV use in the vicinity of the line.

The same mitigating measures used for the applicants' proposed route would also apply to this alternate route.

Temporary and permanent (life of project) losses after mitigation are summarized in Table VIII-80.

TABLE VIII-80

ACRES OF VEGETATIVE COVER LOST

ALTERNATE ROUTE III - MALIN TO MEDFORD

Vegetative Type	Temporary (one year)	Permanent
Desert Shrub	15	3
Grass	13	12
Juniper	8	1
Agricultural	6	1
Coniferous Forest	42	7
Broad Scherophyll	5	1
Totals	89	25
Cause	**Acres**	**Acres**
Temporary Roads	68	
Towers, Footings & Pads	9	
Substation	12	12
ORV Trails		13

Within the 175 foot wide right-of-way there would be 934 acres of commercial forest lands. While only some 7 acres would lose vegetative cover completely, the remainder would be altered to a non-commercial type by permanent removal of tall growing species. The 934 acres has a present stand of approximately 5,000,000 board feet, and an annual growth potential estimated at 373,000 board feet.

WILDLIFE

Impacts on wildlife, including fish, on this alternate across the Klamath Basin would be generally similar to those listed for the proposed route and alternate routes I and II. The main difference would be where migrating and feeding flights of waterfowl are concerned. This northern route, crossing close to Klamath Falls, should pose a relatively minor hazard to waterfowl. A substantial part of Alternate III would run almost due north from the Klamath Hills, thus paralleling most migratory and feeding flight patterns. The crossing at the U.S. 97 bridge, and the Weyerhaeuser mill would be in the vicinity of other high structures that may keep most birds at a safe flight height. However, it was observed that approximately 2 dozen ducks were killed or crippled one foggy night by the 230 KV line crossing upper Link Mtn. at the south end of Klamath Lake just north of Klamath Falls. (Worden, per communication 1976). At any rate, it appears that no major feeding flight would be interrupted by the line with the exception of a few thousand birds flying from the Klamath River to the small lakes in Spring Lake Valley. While this alternate route appears to be relatively safer from a waterfowl loss standpoint than any line directly crossing flight paths from north to south, it will cause some collision losses.

Cavity dwelling wildlife species would be adversly impacted by the loss of 6 miles of forest land habitat on the north side of Chase Mountain. Some possible harassment of deer could occur by placement of the alternate route across the Klamath Hills and Chase Mtn. Deer may benefit from the new "edge effect" in the Chase Mtn. area which will provide more forage than will the forest overstory. Mitigations and unmitigated impacts would be the same as shown for the proposed route, with the exception of waterfowl as noted above. See table VIII-81.

No adverse fisheries impacts are expected on this alternate route, and no anadromous fish are involved.

ARCHAEOLOGICAL AND HISTORICAL VALUES

Cultural values that are present may be impacted directly by disturbance or destruction through project activities (right-of-way clearance, road construction, and transmission line construction). They may also be impacted by collection and/or vandalism by crews during construction. The roads built during construction would allow people to enter into areas that are not presently accessible by vehible, thus increasing the erosion of cultural resource by amateur collectors.

LAND USE

The cause and type of impacts would be the same as discussed for the proposed route, and mitigating measures would also be the same. The residual impacts after mitigation are discussed here.

Table -VIII-81
Unavoidable Adverse Impacts in Wildlife Habitat

	Alternate Route III, Malin to Medford											
	Deer Winter Range			Wildlife		7/Waterfowl		8/Raptors		Wild Horses		
		Acres				No./sites		No./sites			Acres	
	1/Miles	2/D.	3/ID.	Miles	Acres	D	ID	D	ID.	Miles	D.	ID
Malin to Klamath Hills	15	3.0	19,200	0	0	0	0	0	0	0	0	0
Klamath Hills to Keno Dam	6	1.2	4,320	6	126	0	1	0	1	0	0	0
Keno Dam to Lookout Mtn.	0	0	0	27.0	567	0	0	0	0	0	0	0
Lookout Mtn. to	15	3.0	19,200	11.5	242	0	0	0	0	0	0	0
Totals	36	7.2	42,720	44.5	835	0	1	0	1	0	0	0

D. = Direct ID. = Indirect

1/ Estimated miles of power line right-of-way passing through crucial big game or wild horse habitat.
2/ Based on .2 acres of vegetation permanently removed per mile of power line by ORV trail.
3/ Based on the effect of vehicles and people on animals for 1 mile on each side of road (Lineal mileage x 2 x 640 acres per sq. mile).
6/ Based on 21 acres per mile of right-of-way affecting wildlife requiring old growth forest, including those needing snags and other dead trees.
7/ Crosses migration route, but does not impede feeding flights.
8/ "Direct" means when power line crosses production areas or migration routes, or within 2 miles or less of raptor nesting sites. "Indirect" means when power line is close enough to adversely affect these sites.

Grazing

During the construction period there would be a temporary loss of six animal unit months of livestock forage. The permanent (life of project) annual loss of forage production would be four AUM's, or 200 AUM's over a 50 year project life.

Forestry

Some 934 acres would be lost to commercial forest production. The annual average growth potential on this acreage is 373,000 board feet. This amounts to an annual loss of $55,950 based on present stumpage values. Losses over a 50 year project life would total 18,650,000 board feet and $2,797,500.

This equates to an annual loss of two man-years employment in the woods products industries, and 100 man-years over the project life.

Agriculture

During the construction period there would be a loss of six acres of land from agricultural production (one year only). Less than one acre would be lost on a permanent - or life of project - basis.

Urban-Suburban-Commercial-Industrial

Residential impacts would be of the same type as described in Chapter V for the proposed route. Exact data on the number of residences in the vicinity of the line is not available - but it would be more than for the applicants' proposed route or any of the other alternatives. However, the total number would be relatively low considering the length of the line.

This alternate route would have to be very carefully located where it would cross the Klamath River near the Weyerhaeuser Mill Site to minimize conflicts with the present and future industrial-commercial uses.

Special Uses

See the Wildlife Section for impacts on the Miller Island Game Management Area. No other special uses in the route area should be directly impacted after mitigation.

ESTHETICS

Impacts which would result from construction of alternate Route III would be identical to those of the proposed route from the Malin substation to a point near the southern extremity of the Klamath Hills.

Alternate Route III as it extends through the Klamath Hills would be partially visable, depending upon the viewers position in the surrounding Klamath Basin. Visability would be particularly pronounced under reflective light conditions and in those instances where towers and conductors would be skylined on the horizon.

The route would be visable from numerous rural ranch residences and secondary roads as it extends from the Klamath Hills north to the Klamath River. Degree of visual impact would vary greatly and be highest for those residents immediately adjacent to the route. Visual impacts would be increased during periods of reflective light conditions.

The route would cross the Klamath River and U.S. Highway 97 in the vicinity of the Weyerhaeuser lumber mill and other industry related developments south of Klamath Falls, Oregon. Total annual daily traffic at the U.S. Highway 97 crossing is 2,500 vehicles. Overall esthetic impacts in this vicinity are lessened by the presence of extensive industrial development including lumber mills and railroads.

The route would be visable from numerous residences as it parallels State Highway 66 at a distance ranging from ¼ to ½ mile from the Weyerhaeuser lumber mill to Keno, Oregon. Total annual daily traffic on this portion of State Highway 66 ranges from 1,500 to 2,999 vehicles. Degree of visual impact would vary greatly and be highest for those residents immediately adjacent to the route. Visual impacts would be particularly pronounced under reflective light conditions.

The route would cross the Klamath River and State Highway 66 in two locations in the vicinity of Keno, Oregon. The route and its crossing of the Klamath River would be highly visable from Highway 66 and the numerous residences in the vicinity of Keno due to the lack of topographical and vegetative screening. Total annual daily traffic at the State Highway 66 crossings is 610 vehicles. Degree of visual impact would vary greatly and be highest for those residents immediately adjacent to the route. Visual impacts would be more pronounced under reflective light conditions. Visual impacts in the vicinity of the highway crossings would be lessened by the presence of an existing parallel 230 KV transmission line.

Esthetic impacts for the remainder of the route are similar or identical to alternate route II.

Reflective light visual impacts for the entire route, and particularly in such areas as the Klamath Hills and State Highway 66 areas, could be lessened through the use of non-specular conductors and treated towers. Stringing the "sock line" by helicopter and prohibiting additional road-trail development in the Klamath Hills and on the north slope of Chase Mountain would reduce landscape scarring and its esthetic impact. Vegetative clearing measures for the proposed route would reduce visual impacts for the overall route, particularly on the north slope of Chase Mountain. Tower placement and vegetative screening measures for the proposed route would further reduce visual impacts at highway and road crossings. Mitigation measures would lessen, but not eliminate, visual impacts of the route to the same approximate extent as for the proposed route.

Major esthetic impacts are shown in TABLE VIII-82 as follows using a relative scale if High (H), Medium (M) and Low (L).

TABLE VIII-82

ESTHETIC IMPACTS - ALTERNATE ROUTE III

Route as Viewed From	Type of Intrusion	Sensi-tivity Level	Scenery Class	Visual Contrast	Unmiti-gated Impacts	Unavoid-able Impacts
State Highway 39	Highway Crossing	M	L	H	H	M
Klamath Hills - Basin	Partial Visibility and Valley Crossing	M	L	H	H	M
Klamath River	River Crossing	L	L	M	L	L
U.S. Highway 97	Highway Crossing	L	L	H	L	L
Klamath River	River Crossing	M	L	M	M	M
State Highway 66	Highway Crossings (2)	M	L	H	M	M
Klamath River	River Crossing	M	H	H	H	M
State Highway 66	Highway Crossing	M	H	H	H	H
Parallel State Highway 66	Partial Visibility	M	M	M	M	L
Pacific Crest Trail	Trail Crossing	H	M	H	H	M

RECREATION RESOURCES

Impacts would be similar or identical to alternate route II with the exception of some overall reduction in waterfowl hunting - observation impacts described for the proposed and alternate routes I and II. Waterfowl hunting - observation impacts would be lessened through avoiding the crossing of the Tulana Farms area of the Lower Klamath Basin.

Some additional increase in the level of off-road vehicle use could occur along and adjacent to the route through the Klamath Hills. Although the extend of this impact cannot be accurately estimated, it is known that a high demand for motorcycle and other off-road vehicles use areas typically exists adjacent to population centers such as Klamath Falls, Oregon.

SOCIOECONOMIC CONDITIONS

This alternative route differs from the applicant's proposed route in the area of the Klamath Hills to Green Springs, then joining Alternate Route 2. However, this alternative would only be about two miles longer than the applicant's proposed route. Economic and social impacts would be expected to be quite similar to those described in chapter III for the proposed action. No significant differences in construction activities between this alternate route and the proposed route would be expected. Tax revenues would remain almost the same.

Description of Alternative Route IV

This alternative would be the same as the applicant's proposed from the Malin substation on west for about 13 miles to a point on the west side of the ridge on the eastside of the mouth of Dodds Hollow. At that point it would swing southwest, crossing the Klammath about two miles east of Merrill and on into California near the north end of High Rim. It would then continue on south along the foothills of High Rim, and about one half mile east of the existing Siskiyou County road. It would cross the Tule Lake Tunnel and existing KV powerline and continue on southwest across Poverty Flat, into the Modoc National Forest, paralleling to the south, the existing power line from about less than one-quarter mile to better than one-half mile.

It would parallel the existing power line to a point southwest of Laird Landing at the foot of the slope leading up onto Big Tableland. From that point it would parallel the existing line northwesterly to a point about 2-½ miles southeast of Dorris, California. At that point it would swing northwest along the east edge of the ridge between Dorris and Indian Tom Lake. It would cross U.S. Highway 97 about a mile north of Dorris and continue on northwesterly to a point south of Hamaker Mountain, in Oregon, where it would rejoin the propsed route. From that point on into the proposed Medford substation site it would be the same as the proposed route. See Figure VIII-22.

Length of this proposed alternate route is approximately 105 miles. About 454 towers, which would occupy about 7 acres, would be required. Tensioning pads would disturb approximately one acre.

Description of the Environment

GENERAL

Climate, air quality, geology/topography, mineral resources, water resources, and noise would be about the same as discussed in Chapter II.

SOILS

TABLE VIII-83 describes the soils that would be crossed by Alternate Route IV between the Malin substation and Medford.

VEGETATION

The general vegetative types on this route are the same as described for the proposed route (See Chapter II for a detailed description).

Beginning at the Malin substation, this alternative is the same as the proposed route for 13 miles, traversing juniper and desert shrub types. Leaving the proposed route at a point about 5 miles northwest of Merill, Oregon it would proceed south and southwest across juniper for about one mile and agricultural lands five miles to a point near the Oregon-California border. Here the cover changes to the desert shrub

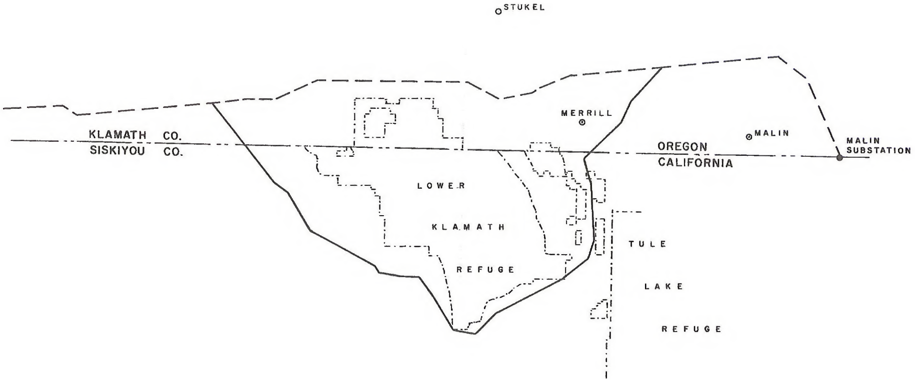


FIGURE VIII - 22
Alternote Route IV ———
Proposed Route — — —

TABLE VIII-83

SOILS TRAVERSED BY ALTERNATE ROUTE IV FROM MAILIN TO MEDFORD, OREGON

Soil Association				Classification				Soil Characteristics							Soil Qualitites & Interpretation				
Map Sym.	Elevation feet	Precip. Inches	Freeze free Season Days	Major land use	Great Group or Subgroup	Family	Series	Position on Landscape	Parent Material	Texture Surface Soil	Texture Subsoil	Coarse Fragments Kind	Coarse Fragments Percent	Profile Depth	Permeability Subsoil	Permeability Substream	Drainage Class	Total Available Water-holding Capacity	Major Soil Problems
3a	4,200-6,000	12-16	90-120	Range	Aridic Lithic Argixierolls	Clay-mont-mesic	Lorella	Uplands	Basalt	Loam	Clayey	--	--	10-20	Slow	--	Good	Very low	Stones; droughtiness
3c	4,500-6,500	18-25	50-90	Forest	Pachic Ultic Argixierolls	Loamy skeletal, mixed, frigid	Woodcock	Uplands	Colluvium	Stony loam	Clay loam	Stone	45	40-60	Moderate	--	Well		Cold temp., erosion
3b	4,050 4,200	10-14	90-120	Pasture	Xerollic Durorthids	Coarse loamy, mixed, mesic	Henley	Bottom lands	Alluvium	Loam	Loam	--	--	20-40	Moderate	--	Somewhat poor		Alkalinity
5a	4,200 4,500	15-18	50 90	Form Range	Typic Haplo Xeholl	Loam, mixed Frigid shallow	NUSS	Bottom lands	Allubium	Silt loam	Silby clay loam	--	--	10-20	Moderate	--	Well		Cold temp.
1c	4,800 6,500	35-50	50	Woodland	Typic Xerochrepts	Loamy skeletal, mixed, frigid	Oatman	Mountainous slopes	Colluvium	Gravelly loam	Cobby loam	Cobbles & Stones	45	40-60	Moderate	--	Good	Medium	Steep slopes; erosion
4d	2,000-3,500	40-60	70-100	Woodland	Ultic Haploxeralts	Fine, loamy, mixed, mesic	Freezener	Mountainous slopes	Basalt colluvium	Loam	Clay loam	Cobbles & Stones	25	40-60	Moderate, slow	--	Well	High	Steep slopes; erosion

type and the route would continue south and southwest through this type for six miles to the Poverty Flat area. Here it would cross agricultural land for one-half mile, then desert shrub for 6-½ miles, and grass land for 1 mile near Laird Landing. The desert shrub type resumes as the the route would turn northwest and prevails for four miles until it would turn westerly across Oklahoma Flat.

Agricultural lands would be crossed for two miles in the Oklahoma Flat area, then desert shrub for about one-half mile. Turning northwest it would traverse a juniper type for 6½ miles to a point near Highway 97 northeast of Dorris, California. Agricultural land would be crossed for one-half mile just west of Highway 97, then the juniper type continues for 4 miles as the route would proceed, generally northwest into Oregon. Coniferous forest type would then be crossed for one mile until this alternate again joins the proposed route at a point about due south of Hanmaker Mountain. From this point to Medford, it would be the same proposed route.

Vegetative type data is summarized in TABLE VIII-84.

TABLE VIII-84

VEGETATIVE ROUTE MILES

ALTERNATE ROUTE IV - MALIN TO MEDFORD

Vegetative Type	Route Miles
Coniferous Forest	45.5
Grass	6.5
Agriculture	8.
Juniper	17.
Desert Shrub	23.
Broad Scherophyll	5.
Total	105.

Wildlife

Alternate Route IV would leave the proposed route approximately 13 miles west of the Malin substation northeast of Merrill near Dodd Hollow. It would then go southwesterly, and cross the California state line at the northern tip of High Rim (Sheepy Ridge). Wildlife found along this part of the alternate route are the same as those found throughout the Klamath Basin. Upland game birds including pheasant and California quail are found in the area, as well as some waterfowl and shore birds. From the California line, the alternate route would go southerly along the west breaks of Sheepy Ridge for about 5 miles. Sheepy Ridge is on

an important waterfowl feeding flight between the Lower Klamath National Wildlife Refuge on the west of Sheepy Ridge to Tule Lake National Wildlife Refuge on the east side of the ridge. Considerable pass shooting is done from blinds on top of Sheepy Ridge. Two private waterfowl clubs are on the southern end of the ridge. Deer and sage grouse use the ridge and a reintroduced California Bighorn sheep population of about 25 animals is found on south Sheepy ridge.

From Sheepy Ridge, the route would turn southwesterly, about 1 mile from, and parallel to, Lower Klamath National Wildlife Refuge boundary on the south side of Lower Klamath Lake to the vicinity of Lairds Landing, near the southern end of Big Tableland. This area contains about 2,000 wintering deer, part of a northern California herd of nearly 20,000 animals. The sage grouse population found in this area is believed to be one of the most westerly in the United States. (Hays, Cal. Fish & Game, personal communication). Chuker partridges are also present along part of this route.

From Lairds Landing, the alternate route would turn northwesterly, cross the Big Tablelands, and Oklahoma Flat, through some low, juniper-covered hills, and cross U.S. Highway 97 about two miles north of Dorris, California. This portion of the alternate route would pass through a portion of antelope range used by about 125 animals, believed to be the most westerly herd of antelope in the United States. (Hays, Cal. Fish & Game, personal communication). An unknown number of wintering deer, pheasants, and quail are found along most of this route segment. Big Tablelands is also used as an antelope fawning area.

This portion of the alternate route would cross Hot Creek, a tributary to Indian Tom Lake, which contains cutthroat trout, planted by the California Department of Fish and Game.

From U.S. Highway 97, near Dorris, the alternate route extends northwesterly along timbered foothills, crosses the state line into Oregon, and rejoins the proposed route south of Hamaker Mountain. There are an unknown number of resident hybrid blacktailed mule deer in Hamaker Mtn. The entire alternate route segment is about 37 miles long.

There is very heavy waterfowl use in all of the Lower Klamath Basin area, and in the Lower Klamath and Tule Lake National Wildlife Refuges. This alternate route would cross major waterfowl migration routes leaving the Klamath Basin.

Threatened and endangered species found in California in the vicinity of the alternate route include the Lost River sucker (Catostomus luxatus), native to the Lost River drainage and considered endangered in California. It does not appear that the alternate route poses a hazard to any fisheries in this area.

In addition, the American peregrine falcon has been seen in the Lower Klamath and Tule Lake refuges, and the southern bald eagle is found as a roosting population at Three Sister Mountain about 9 miles south of the alternate route. Also, as many as 100 to 125 bald eagles winter in the Lower Klamath and Tule Lake National Wildlife Refuges.

ARCHAEOLOGICAL AND HISTORICAL VALUES

This alternate would traverse an area that has known cultural values. Eight Indian Villages have been identified in the ethnographic souces as located along Lost river, north of Tule Lake. At least three villages were located around the southern margin of Lower Klamath Lake, and four others west from the southern margin of the lake. Existing maps and reports do not provide the exact location of many of these villages, but it probably will be possible to identify them by intensive archeological survey methods. Sporadic archeological survey work done since the early 1930's has identified a number of prehistoric sites in the general area of this alternate route. In 1940 Cressman excavated at the Narrows and at Laird's Bay. In 1956 Squire reported the results of excavation of two open sites on Lower Klamath Lake.

Written records regarding the general area indicate that it was not historically significant. However, this alternate would further degrade the historical integrity of the Applegate Trail, since it would parallel the trail more or less closely along several segments.

There are cultural values within the general area of this route. An intensive survey would be required to accurately analyze extent and exact location of these values, and to allow precise planning for avoidance and/or mitigation of impact upon the resource.

LAND USE

General land uses are the same as described for the applicants' proposed route, as this alternate would cross the same general type of country. It would traverse mainly forest and open range country with small communities and sparse settlement.

Grazing

This category includes those lands utilized primarily for grazing of range livestock. Such lands comprise 51.5 route miles and 1,092 acres within the total right-of-way width. This amounts to about 49 percent of the right-of-way width.

Grazing use is primarily by cattle. Use on Federal land is by grazing lease, and based on forage production capacity. Productivity varies widely between areas. Based upon general averages for vegetative types, there are an estimated 104 AUM's of forage within this alternate right-of-way.

Forestry

Coniferous forest lands total 965 acres or 43 percent of the land within the right-of-way. Nearly all of these are commercial lands. The present volume of timber is about 2,320 M board feet, and the annual growth potential is estimated at 290,000 board feet. Generally, the commercial forest zone extends from the vicinity of Hamaker Mountain to Green Springs junction.

Agriculture

Argricultural lands total only 8 route miles, which equals 170 acres within the 175 foot wide right-of-way. Principal uses are hardy grain and pasture. Data is not available as to acreages of various types of crops, or crop yields.

Urban-Suburban-Industrial-Commercial

Highly developed urban-suburban-industrial-commercial use areas would be avoided by the route. No urban-suburban areas would be directly traversed by the route. Following is a tabulation of communities within 3 miles of the route.

Community	Proximity
Merrill	2 miles
Dorris	mile

Scattered residences are found in rural agricultural areas, and in some of the range and forest areas, particularly the area immediately east of Medford and Ashland.

Special Uses

Special land uses within 3 miles of this alternative include:

Buch Butte Communication Site	1 mile
Lower Klamath Wildlife Refuge	within 1 mile
Air Strip (Poverty Flat Area)	1-½ mile
Hamaker Mountain Radar Station	2 miles
Soda Mountain Communication Site	1 mile
Table Mountain Lookout Tower	2 miles
Roxy Ann Peak Communication Site	2 miles

ESTHETICS

TABLE VIII-85 summmarizes the scenery values and sensitivity classification (see Esthetics, Chapter II for explanation) of the area that would be crossed by Alternate Route IV from Malin to Medford.

TABLE VIII-86 provides annual daily traffic data, scenery values and sensitivity classification for locations where alternate Route IV would cross major highways.

Alternate Route IV would also cross 8 secondary roads in Klamath County and 3 secondary roads in Jackson County.

TABLE VIII-85
SCENERY VALUES AND SENSITIVITY CLASSIFICATION
ALTERNATE ROUTE IV - MALIN TO MEDFORD

Miles of Right-of-way	Scenery Value/Sensitivity
1.0	A1
51.0	B2
19.0	B3
6.5	C1
27.5	C2
Total 105.0	

TABLE VIII-86
MAJOR HIGHWAY AND ROAD CROSSINGS
ALTERNATE ROUTE IV - MALIN AND MEDFORD

Crossing	Daily Traffic	Scenic Value/Sensitivity
State Highway 39	3,000	C2
State Highway 161	1,050	C2
U.S. Highway 97	2,700	C2
State Highway 66	770	B2

Alternate Route IV, upon leaving the proposed route 13 miles west of the Malin Substation, would extend in a southwesterly direction across level terrain characterized by rural residential and agriculture - pasture land development (FIGURE VIII-23). The route would cross State Highway 39 approximately 2 miles east of the community of Merrill and State Highway 161 at the northern terminus of Sheepy Ridge (Figure VIII-24).

The route, after crossing State Highway 161, would extend in a southerly direction along the western base of Sheepy Ridge, a topographical landscape feature characterized by rolling foothill terrain and a sagebrush-scattered juniper vegetative type. The route would parallel a graded county road extending from State Highway 161 to the southern portion of the lower Klamath Lake National Wildlife Refuge (FIGURE VIII-25).

Extending from Sheepy Ridge near the Lower Klamath Lake - Tule Lake water diversion tunnel, the route would extend in a southerwesterly direction across the "bench area" terrain forming the southern limit of the Klamath Basin. The area that would be crossed is characterized by undulating - broken terrain and a sagebrush vegetative type. The route is situated adjacent to the Lower Klamath National Wildlife Refuge

FIGURE VIII-23

AGRICULTURAL LAND NEAR MERRILL

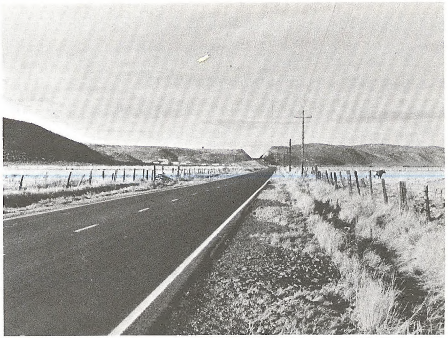


FIGURE VIII-24

STATE HIGHWAY 161 AND NORTHERN EXTREMITY OF SHEEPY RIDGE.

ALTERNATE ROUTE IV CROSSES HIGHWAY IN VICINITY OF HIGHWAY CUT.

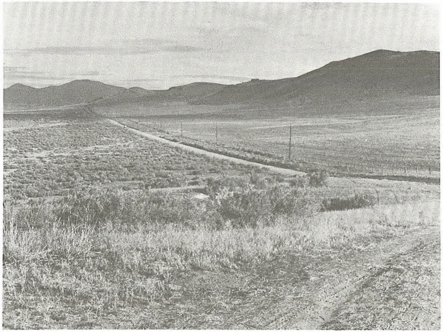


FIGURE VIII- 25

COUNTY ROAD ALONG WESTERN EDGE OF SHEEPY RIDGE.

ALTERNATE ROUTE IV EXTENDS ALONG BASE OF RIDGE AREA.

boundary at a distance ranging from ½ to 1 mile. The Lower Klamath NWR is a National Historic Landmark.

The route would cross approximately one mile south of Lairds Landing, the historic southern terminus of early steamboat operations in Lower Klamath Lake (FIGURE VIII-26).

Extending in a northwesterly direction from the vicinity of Laird Landing, the route would cross Big Tableland, a tableland formation with a sagebrush vegetative type situated adjacent to the Lower Klamath Basin. The route would be situated approximately one mile west of the Lower Klamath NWR boundary, located at the base of Big Tableland (FIGURE VIII-27).

The route across Big Tableland would parallel an existing 69 Kv transmission line (FIGURE VIII-28).

Upon decending the northern extremity of Big Tableland (FIGURE VIII-29), the route would parallel an existing 69 Kv transmission line in a west-northwesterly direction across level agriculture - pasture land (FIGURE VIII-30).

Alternate route IV parallels existing 69 Kv transmission line.

Continuing northwesterly the route would extend through an area of moderate scenic value (Class B) characterized by northwest-southeast trending ridge formations with rolling to moderately steep slopes. The juniper vegetation typical of this portion of the alternate route changes to a conifer type on the southern slope of Hamaker Mountain above the approximate 5000 feet elevation. It would cross U.S. Highway 97 approximately one mile northeast of the community of Dorris, California (FIGURE VIII-31 and VIII-32). A northwest-southeast trending ridge formation visually separates the alternate route from the community of Dorris.

Alternate Route IV connects with the proposed route on the south slope of Hamaker Mountain.

RECREATION RESOURCES

Recreation resources are identical to those described for the applicants' proposed route, with the exception of the Lower Klamath Basin.

The route in the Klamath Basin area would cross immediately adjacent to a privately operated campground at the northern extremity of Sheepy Ridge (FIGURE VIII-33).

The route would extend for a distance of approximately 5 miles along the western base of Sheepy Ridge, an area receiving heavy waterfowl "pass shooting" during periods of favorable waterfowl movement and hunting activity. Numerous waterfowl hunting blinds have been constructed, primarily from native rock materials, on portions of Sheepy Ridge.

FIGURE VIII-26

LAIRD LANDING

FIGURE VIII-27

LOWER KLAMATH BASIN WITH SOUTHERN EXTREMITY OF BIG TABLELAND (RIGHT SIDE OF PHOTOGRAPH). ALTERNATE ROUTE IV WOULD EXTEND ACROSS SLOPE OF BIG TABLELAND VISIBLE IN PHOTOGRAPH.

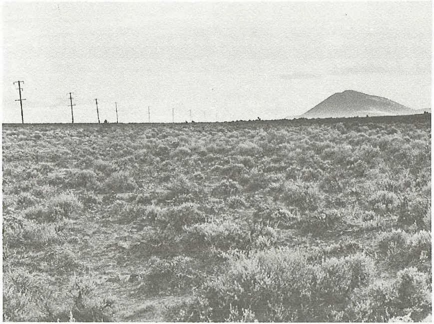


FIGURE VIII-28

EXISTING 69 KV TRANSMISSION LINE ACROSS BIG TABLELAND

FIGURE VIII-29

NORTHERN EXTREMITY OF BIG TABLELAND WITH

LOWER KLAMATH BASIN VISABLE IN BACKGROUND

FIGURE VIII-30

Agricultural Land - Southeast of Dorris, California

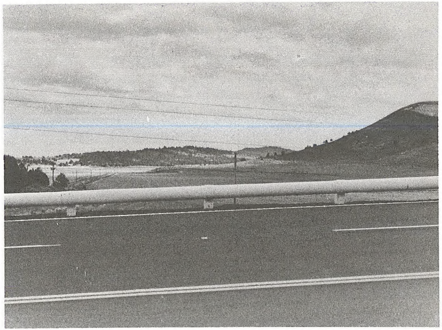


FIGURE VIII-31

ALTERNATE ROUTE IV CROSSING OF U.S. HIGHWAY 97 LOOKING SOUTHEAST

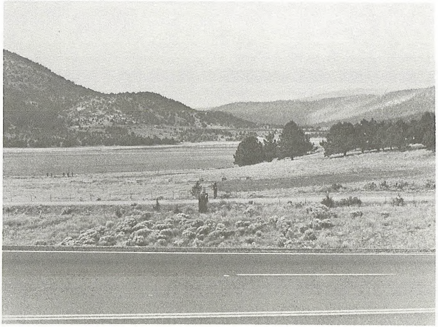


FIGURE VIII-32

ALTERNATE ROUTE IV CROSSING OF U.S. HIGHWAY 97 LOOKING NORTHWEST.

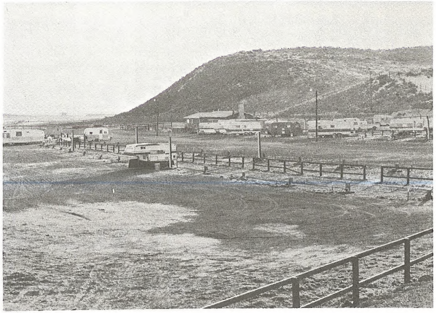


FIGURE VIII-33

SHEEPY RIDGE CAMPGROUND

The route crosses approximately one mile north of the Flyway Club, a private waterfowl hunting club situated in the Sheepy ridge "pass shooting" area between Tule Lake and Lower Klamath Lake (FIGURE VIII-34).

It would extend around the southern extremity of the Lower Klamath National Wildlife Refuge, an area receiving moderate to heavy waterfowl-pheasant hunting, wildlife observation and other recreational sightseeing activity. The Lower Klamath National Wildlife Refuge is a National Historic Landmark.

The route would cross one to two miles west of Indian Tom Lake, an area receiving generally light recreational use, which has been considered for county recreation development.

SOCIOECONOMIC CONDITIONS

The socioeconomic conditions described in Chapter II included a description of seven Idaho and six Oregon counties potentially affected or traversed by the proposed project. Since most of the information has been compiled and published on a county basis, the description of the social and economic environment for this alternative route has largely been included in Chapter II. However, alternative route IV would traverse a portion of Siskiyou County, California.

There are many similarities between Siskiyou County in northern California and the southern Oregon, Klamath, Jackson, and Josephine Counties. The economy is based largely on lumbering, manufacture of wood products, agriculture, and to some extent recreation and tourism. In 1972, Siskiyou County cut 463 MMBF of timber which was exceeded only by two counties with redwood species. Timber and wood processing are important sources of income and employment. In 1970 per capita income in the county was lower than the state average. Employment by sectors of the economy in 1970 were as follows:

Agriculture, Forestry, and Fisheries	11%
Mining	-
Construction	7%
Manufacturing:	
Furniture, Lumber Products	17%
Food and Kindred Products	1%
Transportation and Communication	6%
Utilities	2%
Wholesale and Retail Trade	20%
Services	14%
Finance, Insurance, Real Estate	3%
Public Education	7%
Public Administration	5%

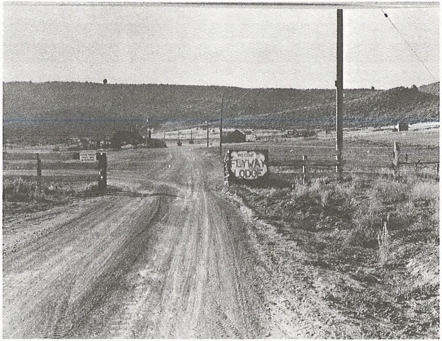


FIGURE VIII-34

PRIVATE HUNTING CLUB

According to Bureau of Census reports, Siskiyou County had a 1970 population of 33,225 which represented a 1% increase from 1960 to 1970. Population projections by the California Department of Finance shows a probable increase to 38,200 persons by 1980. The town of Dorris is located in the Butte Valley census division. This division had a 1970 population of 1,718 persons, which was a decline of 9.2% between 1960 and 1970. The town of Dorris had a 1970 population of 840 persons and represented a decline of 13.7% between 1960 and 1970. The present population of Dorris is estimated at 973 persons.

U. S. Highway 97 passes through Dorris as does the Southern Pacific Railroad.

Analysis of Impacts

GENERAL

The impacts upon climate, air quality, geology/topography, minerals and noise would be the same as discussed in Chapter III.

SOILS

General impacts and assumptions for Alternate Route IV are the same as discussed under the proposed route in Chapter III. Specific erosional impacts are listed in TABLES VIII-87 and VIII-87a and 87b.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total tonnage saved that each mitigating measure achieves.

TABLE VIII-88 shows the unavoidable impacts on soils. This is the net potential soil loss on the particular soils along Alternate Route IV after mitigation.

WATER RESOURCES

General impacts and assumptions for this alternate route are the same as discussed under the proposed route in Chapter III.

There would be no impacts on ground water.

Mitigating measures and their weighted effectiveness for this alternate route are the same as those listed for the proposed route in Chapter IV. Weighted effectiveness can be calculated by determining the percentage of the total sedimentation that each mitigating measure achieves.

Potential sedimentation impacts is listed in TABLE VIII-89.

TABLE VIII- 87

POTENTIAL SOIL LOSS

ALTERNATE ROUTE IV- MIDPOINT TO MALIN

Soil Map Symbol	R Value	K Value	LS Value	Potential Soil Loss (Tons/Acre/Year)
Malin to Jct. of Proposal and Alternate IV East Side (A)				
3a	20	.33	.4	2.6
3c	20	.27	.2	1.1
Average Loss				
Jct. Alternate IV and Proposed Westside (B)				
3b	10	.27	.2	.5
5a	25	.42	0.6	6.3
Average Loss				
West Jct. of Alternate IV and Proposal to Medford (C)				
1c	30	.42	3.5	44.1
4d	30	.37	7.5	83.2
Average Loss				63.6

TABLE VIII-87a

NET POTENTIAL SOIL LOSS DUE TO CONSTRUCTION BY RIGHT OF WAY SEGMENT

ALTERNATE ROUTE IV - MALIN TO MEDFORD

Route Segment	Existing Soil Loss T/Ac/Yr	Average Potential Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
(A)	0.12	1.8	29	3.5	52.2	48.7
(B)	0.62	12.7	8.4	52.1	1066.8	1014.7
(C)	0.12 - 0.62	63.6	123	30.8	7822.8	7792
Total			236	86.4	8941.8	8855.4

TABLE VIII-87b

NET POTENTIAL SOIL LOSS DUE TO OPERATION AND MAINTENANCE BY RIGHT OF WAY SEGMENT

ALTERNATE ROUTE IV - MALIN TO MEDFORD

Route Segment	Existing Soil Loss T/Ac/Yr	Average Potential Soil Loss T/Ac/Yr	Acres Disturbed	Total Existing Soil Loss T/Yr	Total Pot. Loss T/Yr	Net Pot. Soil Loss T/Yr
(A)	0.62	1.8	10	6.	18	12
(B)	0.62	12.7	16	10	203	193
(C)	0.12 - 0.62	63.6	41	10	2624	2614
Total			67	26	2845	2819

TABLE VIII-88

POTENTIAL RESIDUAL SOIL LOSS AFTER MITIGATION

ALTERNATE ROUTE IV - MALIN TO MEDFORD

Route segment	Total Potential Soil Loss 1/ (Tons)
(A)	616
(B)	9,985
(C)	133,271
Total	143,872

1/ The total potential soil loss in the eroision which takes place in year the soil is bare due to construction plus 50 times the net potential soil loss due to operations and maintenance.

TABLE VIII-89

EXISTING SEDIMENT YIELD/CALCULATED INCREASE

ALTERNATE ROUTE IV - MALIN TO MEDFORD

Route Segment	Total Potential Sediment Yield From Acres Affected by Proposed Action Over 50 Years (Ac-Ft)
(A)	0.15575
(B)	2.58000
(C)	33.96075
Total	36.69650

VEGETATION

Vegetative cover would be temporarily lost (one year) due to clearing for access trails, tower sites, tensioning pads and a new substation. Permanent losses (life of project) would be caused by the new substation and increased ORV use in the vicinity of the line.

The same mitigating measures utilized for the applicants proposed route would be applicable to this alternate route. Temporary and permanent unavoidable adverse impacts are summarized in TABLE VIII-90.

TABLE VIII-90
ACRES OF VEGETATIVE COVER LOST
ALTERNATE ROUTE IV - MALIN TO MEDFORD

Vegetative Type	Temporary (1 Year)	Permanent
Desert Shrub	18	4
Grass	15	13
Juniper	12	2
Agricultural	4	-
Forest	38	7
Broad Scherophyl	5	1
Total	92	27

Cause	Acres	Acres
Temporary Roads	70	-
Tower, footings & pads	10	-
Substation	12	12
ORV Travel	-	15

There are 965 acres of commercial forest type within the 175 foot width of the right-of-way. Cover would be completely lost on some 7.4 acres, and the remainder would be altered to a non-commercial type by permanent removal of tall growing commercial trees. This acreage has a present stand of 2,320,000 board feet, and an annual growth potential of 290,000 board feet.

WILDLIFE

Impacts to wildlife along this alternate route would be basically the same as for the applicants proposed route, and alternate I across the Klamath Basin, with these exceptions:

1. The proposed route around the south end of Lower Klamath Lake would result in only minor losses to waterfowl and other migratory birds through collisions with power lines. Fish and wildlife service biologists believe that this alternate route would be much less detrimental to waterfowl than placement in any other part of the Klamath Basin. It would intersect an unknown number of feeding flights and placement on the foothills of Sheepy Ridge (High Rim) would preclude birds from colliding with the lines while flying across Sheepy Ridge between Lower Klamath Lake and Tule Lake Refuges (Fields, per comm.). This

alternate route placement could deflect feeding flights away from some of the nearby duck and goose hunting clubs. Migrations would be above the lines, and feeding flights away from the line in most areas.

2. The alternate route would cross some deer winter range, and go through the home range of approximately 125 antelope, crossing or being adjacent to their kidding range on Big Tablelands. Some harassment and dislocation of these big game animals would occur during construction, and through subsequent public use of the R.O.W. It is not believed that the route would greatly interfere with the California Bighorn sheep recently reintroduced in the south part of Sheepy ridge, since the power line would lie well below the elevation of their range. (See Map D2 in the Draft Statement).

After crossing U.S. Highway 97, the route would go through about 1 mile of timberlands, (to the intersection with the proposed route), destroying almost 21 acres of commercial forest used by cavity dwelling wildlife. TABLE VIII-91 shows adverse impacts to wildlife. Mitigations for disturbance to antelope and other wildlife using the Big Tablelands could include moving the alternate route that follows a small feeder line across the top of the Tableland to a route following around the base of this tableland, about ¼ of a mile to the east of the proposed alternate route.

Other impacts would be unmitigated, as for the proposed route.

ARCHAEOLOGICAL AND HISTORICAL VALUES

Cultural values that are present may be impacted directly by disturbance or destruction through project activities (right-of-way clearance, road construction, and transmission line construction.) They may also be impacted by collection and/or vandalism by crews during construction. The roads built during construction will allow people to enter into areas that are not presently accessible by vehicle, thus increasing the erosion of cultural resources by amateur collectors.

Prior to construction, Grantee shall make a survey of inventory of archaeological, paleontological, and historical sites within the area to be occupied by the right-of-way and the access roads. The results of this survey will be provided to the Authorized Officer. The Authorized Officer may require Grantee to relocate the proposed transmission line facilities in order to avoid destruction of archaeological, paleontological or historic values or to delay construction until salvage operations are completed. In the event archaeological, paleontological, or historical evidence is found during ground disturbing activities such as construction of temporary access roads, tower footings, pulling pads, substations and reactor stations, the Grantee shall immediately cease construction activity and notify the Authorized Officer. The Grantee shall not resume construction until a proper evaluation of the significance of the evidence has been made and the Authorized Officer provides the Grantee with written permission to resume construction. All costs of inventory, survey, evaluation and salvage operations will be borne by Grantee. All salvage shall remain the property of the United States.

Table VIII- 91
Unavoidable Adverse Impacts in Wildlife Habitat

Alternate Route IV, Malin to Medford

	Big Game Winter Range			Wildlife		7/Waterfowl		8/Raptors		Wild Horses		
		Acres				No./sites		No./sites			Acres	
	1/Miles	2/D.	3/ID.	Miles	Acres	D	ID	D	ID.	Miles	D.	ID
Malin to Dodd's Hollow	13	2.6	16,640	0	0	0	0	0	0	0	0	0
Dodd's Hollow to Hamaker Mtn.	18	3.6	23,040	0	0	0	0	0	1	0	0	0
Hamaker Mtn. to Greensprings	10	2.0	7,200	34.5	732	0	0	0	0	15	3.0	19,200
Greensprings to Lookout Mtn.	5	10	6,400	1.0	21	1	0	1	1	0	0	0
Lookout Mtn. to Medford	15	30	19,200	11.5	244	0	0	0	0	0	0	0
Totals	61	11.2	72,480	47.0	987	1	0	1	2	15	3.0	19,200

D. = Direct ID. = Indirect

1/ Estimated miles of power line right-of-way passing through crucial big game or wild horse habitat.
2/ Based on .2 acres of vegetation permanently removed per mile of power line by ORV trail.
3/ Based on the effect of vehicles and people on animals for 1 mile on each side of raod (Lineal mileage x 2 x 640 acres per sq. mile).
6/ Based on 21 acres per mile of right-of-way affecting wildlife requiring old growth forest, including those needing snags and other dead trees.
7/ Crosses migration route, but does not impede feeding flights
8/ "Direct" means when power line crosses production areas or migration routes, or within 2 miles or less of raptor nesting sites. "Indirect means when power line is close enough to adversely affect these sites.

LAND USE

The cause and type of impacts would be the same as for the proposed route - see Chapter III, Land Use. Mitigating measures would be the same as listed in Chapter IV. The following discussion of impacts assumes that proper mitigating measures would be followed.

Grazing

During the construction period, because of loss of vegetative cover, there would be a loss of 7 animal unit months of livestock forage. The permanent annual loss of forage production would be 5 animal unit months, or 250 animal unit months over a 50 year project life.

Forestry

The loss of alteration of 965 acres of commercial forest type would result in a permanent loss of production of 290,000 board feet annually. Based on a stumpage value of $150. per thousand board feet, the annual monetary loss would be $43,500. This loss of timber production also equates to the loss of 1½ man years employment in the woods product industry. Over a 50 year project life, the cumulative loss would be 14,500,000 board feet of timber and 75 man-years of employment.

Agriculture

During the construction period there would be a loss of four acres of agricultural land from production (one year). Less than one-half acre would be lost on a permanent (life of project) basis.

Urban-Suburban-Industrial-Commercial

Residential impacts would be the same as described in Chapter V, Land Use. More residences would be affected than on the applicants' proposed route - but data on the exact number is not available.

Special Uses

The Lower Klamath Wildlife Refuge could suffer some unavoidable impacts from this route. See the Wildlife section for a discussion of this area. No other special use areas should be directly impacted.

RECREATION RESOURCES

Impacts would be identical to the proposed route with the exception of Lower Klamath Basin.

The route would be highly visible as it would pass immediately adjacent to the Sheepy Ridge Campground, a private development on State Highway 161 at the northern extremity of Sheepy ridge. The physical presence of a 500 KV transmission line could adversly impact the recreation experience of campers at this facility. Adverse impacts would result

from both the visibility and sounds resulting from the transmission lines presence.

The alternate route, as it would extend around the southern extremity of the Lower Klamath National Wildlife Refuge, could have an adverse impact on localized waterfowl hunting activities, particularly in the Sheepy Ridge area. Any significant alteration of waterfowl movements, including direction and/or height, could potentially impact localized waterfowl hunting opportunities.

Some additional increase in the level of off-road vehicle use and the attendant landscape scaring, vegetative loss, soil erosion, wildlife harassment, noise, dust and related problems, could occur along and adjacent to the route. Although the extent of this impact cannot be accurately estimated, it is known that a demand for motorcycle and other off-road vehicle use typically exists adjacent to communities such as Merrill, Oregon and Dorris, California.

ESTHETICS

Impacts which would result from construction of alternate route IV are identical to the proposed route for a distance of 13 miles west of Malin substation.

Alternate route IV would cross State Highway 39 approximately two miles east of Merrill, Oregon. Total annual daily traffic at the Highway 39 crossing is 3,000 vehicles. It would be visible from several rural-ranch residences in the vicinity of Merrill and the Highway 39 crossing. Degree of visual impact would vary greatly and be highest for those residents immediately adjacent to the route. Visual impacts would be increased during periods of reflective light conditions.

The alternate route would be partially visible from the Lower Klamath National Wildlife Refuge, depending upon the viewers position within the refuge. The route would also be partially visible from two private waterfowl hunting clubs adjacent to the Lower Klamath NWR. Visibility would be particularly pronounced under reflective light conditions and in those instances where towers and conductors are skylined on the horizon. The Lower Klamath NWR, which is a National Historic Landmark, received 75,000 recreation visits in 1975.

The route would pass within ½ mile of Laird Landing, the historic southern terminus of early day steamboat operations on Lower Klamath Lake. Visibility of the route from Laird Landing would detract from the historical setting of the site. The Laird Landing historic site receives extremely limited sightseeing visitation use at this time.

The route would cross U.S. Highway 97 approximately one mile northeast of Dorris, California. Total annual daily traffic at the U.S. Highway 97 crossing is 2,700 vehicles. The route would be screened visually from the community of Dorris by a 200-600 foot ridge formation. Visibility of the route from the U.S. Highway 97 crossing would be increased through right-of-way clearing of the juniper and coniferous

Table VIII-92
Esthetic Impacts - Alternate Route IV

Route as Viewed From-	Type of Intrusion	Sensitivity Level	Scenery Class	Visual Contrast	Unmitigated Impacts	Unavoidable Impacts
State Highway 39	Highway Crossing	M	L	H	H	M
State Highway 161	Highway Crossing	M	L	H	H	M
Lower Klamath NWR	Partial Visibility					
U.S. Highway 97	Highway Crossing	M	L	H	H	M
Klamath River & Canyon Rims	River Crossing	H	H	H	H	H
Pacific Crest Trail	Trail Crossing	M	M	H	H	M
State Highway 66	Highway Crossing	M	M	H	H	H
Antelope Creek	Partial Visibility	M	M	M	M	L

vegetation, particularly to the northwest as it would extend onto the south slope of Hamaker Mountain. Visual impacts would be particularly pronounced under reflective light conditions.

Esthetic impacts for the remainder of the route are identical to the proposed route.

Reflective light visual impacts for the entire route, and particularly in such areas as the State Highway 39-161 and U.S. Highway 97 crossings, Sheepy Ridge and the Lower Klamath NWR, could be lessened through the use of nonspecular conductors and treated tower steel. Stringing the "sock line" by helicopter and prohibiting additional road-trail development on the slopes of Big Tableland and on the south slope of Hamaker Mountain would reduce landscape scarring and its esthetic impact. Vegetative clearing measures for the proposed route would reduce visual impacts for the overall route, particularly on the south slope of Hamaker Mountain. Tower placement measures for the proposed route would further reduce visual impacts at highway and road crossings. Mitigating measures would lessen, but not eliminate, visual impacts of the route to the same approximate extent as for the proposed route.

Major esthetic impacts are shown in Table VIII-92 as follows, using a relative scale of High (H), Medium (M) and Low (L).

SOCIOECONOMIC CONDITIONS

This alternative route varies from the applicant's proposed route by dipping south near Merrill, Oregon into northern California near the north end of High Rim, then paralleling an existing power line south and west, northwest crossing Highway U.S. 97 about 1 mile north of Dorris, then continuing northwest to join the proposed route. Total length of this alternate route is 105 miles, which is about 13 miles longer than the applicant's proposed route.

The impacts of construction, operation, and maintenance of the proposed 500 KV powerline along this route would not be expected to result in significant differences from those described in Chapter III for the applicant's proposed route. Although the powerline would pass very near the town of Dorris, construction crews would very likely consider Klamath Falls as "permanent headquarters". Impacts on Dorris, therefore, would probably be limited to incidental purchases of gas and oil, food, and other basic items.

The difference in tax revenues generated by the proposed project would include Siskiyou County, but the overall effect would be minor considering the total Malin to Medford line segment.

The impacts of skirting the Klamath Basin are discussed in the Wildlife, Recreation, and Esthetics portion of this chapter.

SUMMARY-ANALYSIS OF PROPOSED AND ALTERNATE ROUTES

The following tables summarize and compare the environmental impacts that would occur along the applicant's proposed route and Alternate routes I, II and III from Midpoint, Idaho to Malin, Oregon.

TABLE VIII-93

COMPARISONS OF THE IMPACTS UPON SOIL AND WATER FOR THE PROPOSED AND ALTERNATE ROUTES FOR THE LIFE OF THE PROJECT (INCLUDES CONSTRUCTION PLUS OPERATION AND MAINTENANCE)

MIDPOINT TO MALIN

Route	Potential Soil Loss (Tons)	Potential Sediment Yield (Ac-Ft)
Proposed	5,268.2	1.31743
Alternate I	14,023	3.50575
Alternate II	30,280	7.57000
Alternate III	15,800	3.95000
Alternate IV	17,746	4.43650

TABLE VIII-94

COMPARISON OF IMPACTS - MIDPOINT TO MALIN

Impacts	Proposed Route	Alternate 1	Alternate 2	Alternate 3	Alternate 4
Vegetation					
Acres of cover permanently lost	75	67	73	70	68
Land Use					
Range: AUM's permanently lost	6.4	4.1	6.3	4.9	4.8
Forestry: Annual production lost (1000 bd.ft.)	93	235	93	191	191
Agriculture: Acres permanently lost	2.1	3.9	2.6	1.9	2.4
Special Uses: Number of areas impacted	1	0	0	1	0

TABLE VIII-95

SUMMARY - MIDPOINT TO MALIN - PROPOSED AND ALTERNATE ROUTES

Miles and Acres of Wildlife

Habitat Adversly Affected

	Deer Winter Range			Antelope Range			Wild Horse Range			(6) Forest Wildlife		(7) Waterfowl		(8) Raptors		
	Acres			Acres			Acres					By No. of Sites		By No. of Sites	New Access in Remote Areas	
Route Segment	(1) Miles	(2) Direct	(3) Indirect	Miles	Direct	Indirect	Miles	Direct	Indirect	Miles	Affected	Direct	Indirect	Direct	Miles	(3) Acres
Proposed Route	78	15.6	99,800	71	14.2	90,900	6	1.2	3,800	16.0	325	3	4	4	41	52,500
(5) Alternate I	69	11.8	69,100	60	12.0	76,800	2	.4	1,300	37.0	785	3	4	4	20	25,600
Alternate II	55	11.0	70,400	45	8.0	57,600	3	.6	3,800	16.0	325	4	4	5	31	39,700
(5) Alternate III	42	6.4	34,500	103	20.6	131,800	24	4.7	26,800	33.5	678	2	4	2	44	56,400
(5) Alternate IV	19	1.8	5,100	77	15.4	98,500	21	4.2		33.5	678	3		4	34	43,600

(1) Estimated miles of power line right-of-way passing through crucial big game habitat.

(2) Based on .2 acres of vegetation permanently removed per mile of power line for ORV Trail.

(3) Based on the effect of vehicles & people on animals for 1 mile on each side of trail (lineal milage x 2 x 640 acres per sp. mile.)

(5) Part of route is along existing power lines - no new indirect impacts.

(6) Based on 21 acres per mile of right-of-way affecting wildlife requiring remote areas and old growth forest, including those needing snags & other dead trees.

(7 &8) "Direct" means when power line crosses production areas or migration routes or within two miles of raptor nesting sites. "Indirect" means when power line is close enough to adversely affect these sites. Refuge proximity gives weighted average.

TABLE VIII -96

Impact Comparison of Proposed and Alternate Routes

Aesthetic and Recreation

Midpoint to Malin

Proposed Route					Alternate Route I					Alternate Route II					Alternate Route III					Alternate Route IV				
Scenery-Sensitivity Classification	Miles	Number of Highway Crossings	Annual Daily Traffic	Number of Secondary Road Crossings	Scenery-Sensitivity Classification	Miles	Number of Highway Crossings	Annual Daily Traffic	Number of Secondary Road Crossings	Scenery-Sensitivity Classification	Miles	Number of Highway Crossings	Annual Daily Traffic	Number of Secondary Road Crossings	Scenery-Sensitivity Classification	Miles	Number of Highway Crossings	Annual Daily Traffic	Number of Secondary Road Crossings	Scenery Sensitivity Classification	Miles	Number of Highway Crossings	Annual Daily Traffic	Number of Secondary Road Crossings
A1	9.5	9	10,490	29	A1	-	15	25,480	57	A1	9.5	14	24,340	41	A1	-	9	11,530	35	A1	-	14	24,280	45
A2	2.0				A2	-				A2	-				A2	2.0				A2	-			
A3	-				A3	-				A3	-				A3	-				A3	-			
B1	-				B1	2.0				B1	-				B1	-				B1	-			
B2	69.0				B2	32.0				B2	40.0				B2	64.0				B2	35.0			
B3	6.0				B3	70.0				B3	27.0				B3	29.0				B3	50.0			
C1	5.0				C1	-				C1	-				C1	5.0				C1	-			
C2	218.5				C2	205.0				C2	275.5				C2	169.5				C2	226.5			
C3	81.0				C3	132.5				C3	59.0				C3	159.5				C3	137.5			

(a) Lowest factor - lowest impact; highest factor - highest impact - See analysis

The following tables summarize and compare the environmental impacts that would occur along the proposed route and the four alternate routes between the Malin substation and Medford, Oregon.

TABLE VIII-97

COMPARISONS OF THE IMPACTS UPON SOIL AND WATER

FOR THE PROPOSED AND ALTERNATE ROUTES

(includes construction plus operation and maintenance)

MALIN TO MEDFORD

Route	Potential Soil Loss (tons)	Potential Sediment Yield (Ac-Ft)
Proposed	67,199.9	16.79998
Alternate I	64,367	16.09175
Alternate II	137,340	34.33500
Alternate III	156,235	39.65500
Alternate IV	143,872	36.69650

TABLE VIII-98

COMPARISON OF IMPACTS - MALIN TO MEDFORD

IMPACT	PROPOSED ROUTE	ALTERNATE I	ALTERNATE II	ALTERNATE III	ALTERNATE IV
VEGETATION:					
1. Acres of cover permanently lost	26.	24.	27.	25.	27.
LAND USE:					
1. Range: AUM's permanently lost	3.6	4.0	3.4	4.1	5.0
2. Forestry: Annual production loss (1,000 bd.ft.)	300	192	377	373	290
3. Agriculture: Acres permanently lost	0.6	0.8	0.5	1.0	0.4
4. Special Uses: Number of acres affected	0	0	0	0	0

TABLE VIII - 99

SUMMARY - PROPOSED ROUTE & ALTERNATE ROUTES

MALIN TO MEDFORD

Miles & Acres of Wildlife & Horse Habitat Adversely Affected

	Deer Winter Range			(6) Forest Wildlife		(7) Waterfowl		(8) Raptors		Wild Horse Range		
	Acres					By No. of Sites		By No. of Sites		Acres		
Route	Miles (1)	Direct (2)	Indirect (3)	Miles	Acres Affected	Direct	Indirect	Direct	Indirect	Miles	Direct	Indirect
Proposed Route	56	112	71,700	47.0	976	1	0	1	3	15	3.0	19,200
Alternate Rt I	59	118	75,500	34.5	724	1	0	0	1	15	3.0	19,200
Alternate Rt II	30	60	38,400	45.0	924	1	0	1	1	0	0	0

(1) Estimated miles of power line right of way passing through crucial big game habitat.

(2) Based on 2 acres of vegetation permanently removed per mile of power line road construction.

(3) Based on the effect of vehicles and people on animals for 1 mile on each side of the road or trail (lineal mileage X 2 X 640 acres per sq. mi.).

(6) @ 21 acres of timber per mile of right of way that will not return to old growth, affecting wildlife requiring old growth forest, including needing snags and other dead trees.

(7 & 8) "Direct" means when power line crosses production areas or migration routes. "Indirect" means when power line is close enough to adversely affect these sites.

For Raptor sites, "Indirect" means within 2 miles or less of nesting sites.

TABLE VIII - 100

IMPACT ANALYSIS OF PROPOSED & ALTERNATIVE ROUTES

ARCHAEOLOGICAL AND HISTORICAL VALUES

MALIN TO MEDFORD

Proposed Route	Alternate Route I	Alternate Route II
Insufficient Data - All routes approximately equal		

TABLE VIII-101
IMPACT ANALYSIS OF PROPOSED & ALTERNATE ROUTES
RECREATION AND AESTHETICS
MALIN TO MEDFORD

Proposed Route	Alternate Route I	Alternate Route II	Alternate Route III	Alternate Route IV
2 Klamath Basin	2 Klamath Basin	2 Klamath Basin	2 Klamath Basin - Hills	2 Lower Klamath NWR
3 Klamath River Crossing	3 Klamath River Crossing	2 Klamath River Crossing	1 Klamath River Crossing	3 Klamath River Crossing
2 Pacific Crest Trail	2 Pacific Crest Trail	1 State Highway 66-Paralleling	2 Klamath River Crossing	2 Pacific Crest Trail
1 Antelope Creek Canyon	3 Medford-Ashland Foothills	2 Pacific Crest Trail	2 Klamath River Crossing	1 Antelope Creek Canyon
4 Major Transportation Route Crossings - Moderate Impact 1/	10 Major Transportation Route Crossings - Moderate Impact 1/	1 Antelope Creek Canyon	1 State Highway 66-Paralleling	6 Major Transportation Route Crossings - Moderate Impact
3 Major Transportation Route Crossings - High Impact 1/		4 Major Transportation Route Crossings - Moderate Impact 1/	2 Pacific Crest Trail	3 Major Transportation Route Crossings - High Impact 1/
		3 Major Transportation Route Crossings - High Impact 1/	1 Major Transportation Route Crossing - Low Impact 1/	
			4 Major Transportation Route Crossings - Moderate Impact 1/	
			3 Major Transportation Route Crossings - High Impact 1/	
15 Total 2/	20 Total	15 Total	18 Total	17 Total

1/ Number of crossings X1 (low impact); X 2 (moderate impact); X 3 (high impact)

2/ Lowest number = lowest impact; highest number = highest impact.

TABLE VIII - 102

IMPACT COMPARISON OF PROPOSED & ALTERNATE ROUTES
ESTHETICS & RECREATION - MALIN TO MEDFORD

Proposed Route

Scenery-Sensitivity Classification	Miles	Number of Highway Crossings	Annual Daily Traffic	Number of Secondary Road Crossings	Recreation and Aesthetics Impact Evaluation Factor- See Analysis (a)
A1	1.0	3	6470	11	15
A2	--				
A3	--				
B1	--				
B2	47.5				
B3	19.0				
C1	--				
C2	24.5				
C3	--				

Alternate Route I

Scenery-Sensitivity Classification	Miles	Number of Highway Crossings	Annual Daily Traffic	Number of Secondary Road Crossings	Recreation and Aesthetics Impact Evaluation Factor- See Analysis
A1	1.0	5	8010	12	20
A2	--				
A3	--				
B1	4.0				
B2	24.5				
B3	19.0				
C1	19.5				
C2	24.5				
C3	--				

Alternate Route II

Scenery-Sensitivity Classification	Miles	Number of Highway Crossings	Annual Daily Traffic	Number of Secondary Road Crossings	Recreation and Aesthetics Impact Evaluation Factor- See Analysis
A1	--	3	6310	14	15
A2	1.0				
A3	--				
B1	--				
B2	57.5				
B3	--				
C1	--				
C2	29.0				
C3	--				

(a) Lowest factor = lowest impact; highest factor = highest impact - See Analysis

TABLE VIII-102 (Cont'd)

Alternate III					Alternate IV				
Scenery-Sensitivity Classification	Miles	Number of Highway Crossings	Number of Secondary Road Crossings	Recreation and Aesthetics Impact Evaluation Factor-See Analysis (a)	Scenery-Sensitivity Classification	Miles	Number of Highway Crossings	Number of Secondary Road Crossings	Recreation and Aesthetics Impact Evaluation Factor-See Analysis
A1	--	5	21	18	A1	1.0	4	11	17
A2	1.0				A2	--			
A3	--				A3	--			
B1	--				B1	--			
B2	58.0				B2	51.0			
B3	--				B3	19.0			
C1	--				C1	6.5			
C2	32.5				C2	27.5			
C3	2.5				C3	--			

ALTERNATE PROJECT DESIGNS

Undergrounding

According to Bonneville Power Administration, in its August 19, 1974, Construction and Maintenance Program Environmental Impact Statement, situations where underground transmission has been utilized in the U. S. are as follows:

a. Where the capital cost of the underground system is less than the overhead such as areas having high right-of-way costs or areas where a submarine crossing would avoid a long bypass route.

b. Where underground transmission has a unique suitability for certain applications such as the elimination of critical aerial crossings of other transmission lines, reducing the hazard to aviation near airports or enabling entry to a substation when the area around the substation is congested.

Situations where underground transmission is usually not appropriate from a technical standpoint include:

a. Areas of very hilly terrain where there are large elevation differences and steep slopes.

b. Areas of very poor ground conditions such as unstable soils, swamps, or underlying rock.

c. Portions of the transmission system where long outages could not be tolerated.

Several studies have been made in recent years regarding the costs of underground and overhead transmission. In the A. D. Little Report to the Electric Research Council (published October 1971), underground transmission costs are shown to be as high as 10 times that of overhead transmission along the same right-of-way. Compressed gas systems may run as high as 20 times.

The reasons underground cable costs are so much more than overhead lines are (1) underground transmission installation normally requires the digging of a trench and subsequent backfilling often with special material such as "thermal sand," which together usually costs more than that required to completely furnish and install an overhead line of equivalent capacity, (2) material costs are generally much higher for underground cables, (3) more man-hours and therefore higher labor costs are involved in the installation of underground cable; for example, a splice on a 345-KV cable can take eight or more 24-hour workdays and must be performed in a specially constructed air-conditioned room, and (4) necessary line compensation often required for underground cables imposes an additional cost.

In addition to the above cost considerations, other factors involved in deciding upon whether to use overhead or underground transmission are reliability or frequency of repair, the facility of repair, the flexibility

of the line to serve future loads, differences in elevation between terminals, technological constraints, and environmental costs and benefits.

The excavation of the trench itself can cause considerable disruption of the environment, particularly if rock is just below the surface and blasting is required. Also, a backfilled trench, if it is on a slope, is difficult to stabilize to prevent longitudinal erosion. Underground cables continuously give off heat which may be harmful in a particular ecosystem. Because of the need to provide for future maintenance, a cleared right-of-way must be maintained, even though this may not be as wide as that required for aboveground transmission.

In regard to flexibility, overhead lines have an advantage over underground cable in that they can be adapted to meet future electric power demands. In this regard, underground cables are difficult and expensive to tap if the need should arise, whereas, new connections can be readily made to overhead lines. In addition, overhead lines can usually be upgraded to conductors of greater capacity if future loads result in increased power demands.

Another major disadvantage with underground cables is the operating constraints and current carrying capacity imposed by present technology. Capacitance, which causes a charging current resulting in decreased usable power is 25 to 30 times greater with an underground cable than with a comparable overhead line."

Undergrounding would eliminate the visual impact of the towers and conductors and, in waterfowl migration areas, eliminate the possibility of collisions.

For detailed undergrounding information refer to "A study of Environmental Impact of Underground Electric Transmission Systems", May, 1975, prepared for the Electric Power Research Institute and the Energy Research and Development Administration; distributed by the U.S. Department of Commerce, National Technical Information Service.

Voltage

The next lower voltage to 500 KV is 345 KV. Two 345 KV lines would be required to provide the 1,500 megawatt (megawatt = 1,000 watts) capacity of a 500 KV line. They would require a right-of-way approximately 315 feet wide compared to 175 feet proposed for Pacific's 500 KV line.

Overall environmental impacts of constructing, operating and maintaining two 345 KV lines would be substantially greater than for one 500 KV line.

The next higher voltage to 500 KV is 765 KV. A 765 KV transmission line has the capacity to transmit approximately 3,000 megawatts. According to Pacific, this far exceeds the amount of electricity currently available for transmission.

Right-of-way requirements and associated environmental impacts for a 765 KV line are generally slightly greater than for a 500 KV line. Except for potentially greater electrical effects, however, overall environmental impacts of constructing, operating and maintaining a 765 KV line would be generally the same as for a 500 KV line.

FIGURE VIII-35 illustrates the marked reduction in power loss resulting from increasing voltage levels. Loss from a 500 KV line, for example, is about one-fourth that from a 230 KV line. A 1100 KV line loses approximately one-half as much as a 500 KV line.

NO ACTION

A "no action" alternative would negate construction of the proposed transmission line. If this was done, alternate sources of power or purchase of power and transmitting it to the load area over existing grids would be required to meet Pacific's stated need. If these alternatives should not be possible or feasible other alternatives are discussed below.

The following information was adapted from draft environmental statement BPA Participation in Regional Interutility Cooperation, prepared by Bonneville Power Administration, April 1, 1975.

Hydro

The Pacific Northwest is richly endowed with hydropower resources. The various Federal and non-Federal dams on the Columbia River and its tributaries constitute the largest and most thoroughly developed hydroelectric system in the world. One-third of the nation's hydroelectric potential exists within the Pacific Northwest.

To date, the Pacific Northwest has been able to utilize hydropower for both baseload and peakload requirements. The hydro generation is almost fully developed in terms of its ability to meet baseloads. The system has the capability of having additional units installed at existing plants to increase peaking capacity. One listing of potential projects identifies the possibility of an additional 18,657 megawatts of peak electricity production, a small amount of which is potential pumped storage development. (Pacific Northwest River Basins Commission, 1973)

Nearly all available sites for major hydroelectric dams in the region which produce significant quantities of electric energy have been developed. There are four new dams under construction and only three projects which are authorized for future Federal construction. Of these, only one, Libby Reregulating, is being considered for construction in the next decade. About 90 percent of the FCRPS projects under construction or under construction projects. Less than 10 percent of the existing system is located west of the Cascades. Future additions being considered will not significantly alter this ratio.

TYPICAL TRANSMISSION LOSSES

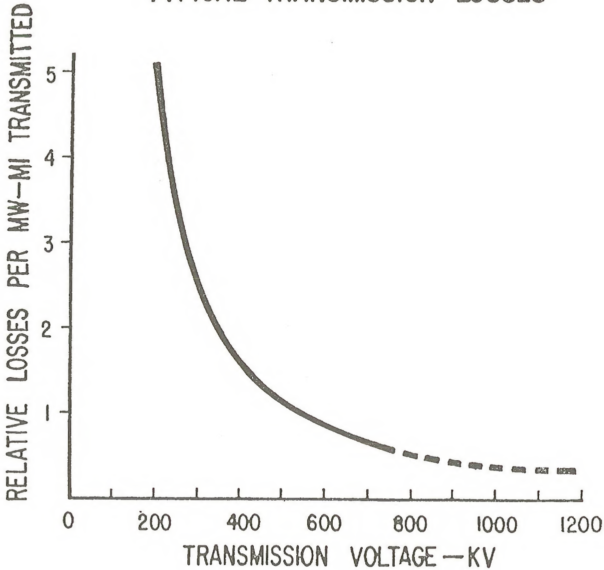


FIGURE VIII- 35

Source: PP&L

While less than 10 percent of existing and projected hydro facilities are west of the Cascades, over 75 percent of the projected future load increases will be west of the mountains, necessitating increases in transmission capacity through the few available mountain corridors. Depending upon the location of future thermal generating plants, this added transmission capacity requirement will range from 10,000 to 20,000 MW by 1995.

Other than the emission of air pollutants from construction equipment during the actual construction of a given hydro facility, no air emissions will result from additional hydro generation.

The release of water over dam spillways increases the total dissolved gas content of the water downstream, which can have an adverse effect upon aquatic life. Further development of existing dams will mean more water passing through turbine blades and less over spillways, with a consequent decrease in dissolved gases in water. However, this increases the possibility of anadromous fish being killed by turbines.

Water passed through the turbine at a high storage dam is taken from a much deeper level in the reservoir than water which passes over the spillways. Deeper water (which is generally lower in oxygen content) is cooler in the summer and warmer in the winter than water at the surface. Therefore, an ecological impact can occur should released water temperatures be at variance with historically established patterns.

The construction of new hydroelectric dams and the resulting impoundment of large bodies of water will effectively remove the land to be flooded from any future use. The construction of additional generation at existing dams would not result in as great an adverse impact on land use, because there additional facilities are built upon land which has already been irretrievably committed to hydroelectric development. However, increased use of a given hydro facility for peaking purposes would impact future land use along the shoreline downstream because of sudden fluctuations in the river level. Hydroelectric facilities sufficient to meet Pacific's projected power deficit could not be constructed within the stated time frame.

NUCLEAR

Although there are only relatively small known reserves of uranium ore in the Northwest, this poses no problem for nuclear plant construction in this region. Nuclear fuel is relatively compact in relation to its energy content. A year's supply of fuel for a typical nuclear plant can be delivered in a few truck loads over a period of a few days.

Nuclear plants have greater flexibility in siting than hydro or coal-fired facilities. Since the compactness of the fuel poses no real transportation problem (although care must be taken to maintain high safety standards), the major requirements are that the plant be located where cooling water is readily available, and that the site be on geologically stable terrain.

Such minimal siting requirements would seemingly encourage site locations near load centers in order to minimize transmission line requirements. However, the recently evolving concept of nuclear parks to take advantage of centralized radioactive waste processing and disposal, fuel fabrication, and other support industry argues in favor of locations away from population centers. In addition, some of the plans currently under consideration for productive use of waste heat for agricultural irrigation would realize their greatest potential in sites east of the Cascades.

Other than minor amounts of radioactive releases, air emissions from nuclear plants are not significant. A 1,000 MW Nuclear energy system would emit about 6,200 tons of air pollutants annually, primarily as a result of the mining and milling operation. This is about six percent of the amount of air emissions from a comparable size mine-mouth coal-fired plant. A nuclear power plant, to a small degree, but principally its fuel cycle, does emit a small amount of radioactive material into the environment. Of these emissions over 99 percent are attributable to the fuel processing cycle while less than one percent is associated with the nuclear reactor. The amount emitted depends upon the exact plant design and the design of related fuel facilities, but, in all cases, the impact on the environment is thought to be negligible under contemporary standards of measurement.

Light water nuclear plants have relatively low thermal efficiencies, around 33 percent compared to 38 percent for large modern fossils plants. A part of the losses of fossil plants is discharged up the stack which, together with the higher efficiency, results in substantially less condenser or "waste heat" loss for the modern fossil plant. Thus, the less efficient light water nuclear plants having no stack losses reject all of their waste heat to the environment through the steam condensers. An environmental concern, therefore, is the impact associated with the discharge of cooling water used to carry off the large amounts of waste heat. Cooling towers or cooling ponds can be used to dissipate the heat.

In addition to mining wastes, nuclear energy systems create a unique kind of solid waste problem. A 1,000 MW nuclear energy system will produce irradiated fuel and highly toxic, concentrated nuclear waste material containing 140,000,000 curies of activity annually. These products from the fission process are transported to reprocessing plants where the fuel is chemically treated to recover the usable uranium and plutonium which was produced at the nuclear power plant. The remaining radioactive wastes are then stored at the reprocessing site. Radioactive emissions to the air are greatest from reprocessing plants.

Due to their long half lives and the biological hazards involved, the concentrated fission waste products cannot be discharged into the environment, but must be monitored and stored for hundreds of thousands of years.

No permanent storage facility has been developed. In addition, disastrous radioactive releases could occur from accidents in power plant operations or due to catastrophic accidents during the transport of radioactive materials. Elaborate precautions make the probability of such occurrences very remote but not impossible.

Nuclear energy systems have much less impact on lands use than do coal-fired systems. Nevertheless, the plant site itself and the transmission corridors associated with any type of generating plant does not limit the use of some land. About 800 acres are required for use in fuel-related facilities to operate a 1,000 MW nuclear system during each year. The average land area requirement for the single unit nuclear power plant itself, including the exclusion area, is 600-800 acres. The total land in use for nuclear energy systems is about 40 percent of the land expected to be affected by a comparably sized mine-mouth coal-fired energy system.

A 1,000 MW light water nuclear power plant would consume approximately 1.1 tons of uranium 235 in one year, assuming a 75 percent capacity factor. In addition, if coal-fired generation is the source of electricity consumed in the enrichment step of the nuclear fuel cycle, about 150,000 tons of coal will be burned each year. Known reserves of naturally occurring fissionable material (U-235) in the United States will last approximately 25-50 years at projected rates of use. In addition, there are known reserves that can be mined at a higher cost that can extend this period considerably. Exploration and utilization of foreign ore now that the embargo is being lifted, further expands the available uranium ore for the United States nuclear power plants. The Liquid Metal Fast Breeder Reactor, by converting more uranium into usable fuel than it consumes, holds the promise of a uranium energy utilization of 60 percent as compared to less than a two percent energy utilization obtainable in present light water reactors. Fast breeder technology can be expected to increase the projected lifetime of fissionable reserves to hundreds of years. Of course, if fusion power becomes technologically and economically possible, it can extend the energy supply almost indefinitely.

COAL

The Pacific Northwest is relatively deficient in fossil fuel resources. (Crump, L. H. and C. L. Readling, 1974.) The coal-fired plant at Centralia, Washington, currently is designed for 1,400 megawatts of capacity, and there is not enough indigenous coal reserves in the Puget Sound area to warrant any significant additions to coal generating capacity. However, large deposits of fossil fuel in the states of Montana and Wyoming may be available to be used in plants located either at the mine mouth or elsewhere in the Pacific Northwest.

A 1,000 MW coal-fired plant operating at a 75 percent plant factor would consume 3,300,000 tons of coal annually. The proven reserves of bituminous and lignite coal in the states of Wyoming and Montana (the most likely fuel sources of coal serving the Pacific Northwest) is estimated to be 154 billion tons. (Crump, L. H. and C. L. Readling, 1974.)

Despite the distance of these Montana and Wyoming coal deposits, the Pacific Northwest could derive benefit from these resources by either of two methods. Coal could be mined in Montana and Wyoming and shipped by train, coal slurry pipeline, or train and barge to coal-fired plants closer to the load centers in this region. Alternatively, coal-fired plants could be located in the mining areas and the power tied

into the grid by long distance transmission lines. Either method involves the use of energy in making the electricity available to the ultimate consumers in the major load centers west of the Cascades. However, shipping the coal by train to the load centers will most likely involve the use of relatively scarce diesel oil, whereas transmission line losses from mine-mouth generation would involve the use of coal, a much more abundant energy resource.

Coal-fired plants, like any steam turbine generation, will need to be located near a readily available source of cooling water.

The air emissions from a 1,000 MW coal-fired plant would be significant. In the course of one year of operation, a mine-mouth plant would result in (with current technology) about 45,000 tons of atmospheric emissions, mainly in the form of particulates and oxides of nitrogen, carbon, and sulfur. In the case of a load centered plant, the emissions could possibly be greater (as much as 34,000 tons greater), mostly due to the particulates of coal that are blown off the train during transport, unless mitigating measures are adopted.

Potential heat pollution occurs at the generating plant in the form of rejected heat contained in discharged cooling water. This situation could be remedied, as in the case of a nuclear plant, by constructing cooling towers or by employing the discharged water for some productive purpose as discussed above. The majority of the liquid effluents are in the form of suspended particulate matter in water which is used during the fuel extraction process. The extraction of fuel and the operation of a 1,000 MW coal-fired plant would generate about 3,000 tons of liquid effluents annually.

Operation of a 1,000 MW coal-fired plant would result in approximately 4,200,000 tons of solid waste annually (most of which are mining wastes). About two-thirds of the solid waste would be generated in the mining process while the remainder is produced during the processing and conversion stages.

A coal-fired plant could not go on-line within Pacific's slated time frame.

Another significant impact associated with coal-fired plants is impact on land use. Most of the coal to be mined in the western states will probably be surface mined. While it is assumed that this land will be reclaimed, over 900 acres is used annually in mining and about an equal amount is used for the conversion stage.

Surface mining is the most common means of extracting coal resources in this region. This method disturbs large amounts of land and can lead to acid mine drainage and silt runoff, both of which degrade water quality. The land impacted by a 1,000 MW coal-fired energy system varies from approximately 2,000 acres annually for a mine-mouth plant to approximately 4,000 acres continuously for a load-centered plant in the Pacific Northwest which includes the use of railroad rights-of-way. (It should be noted that the former type of plant will additionally require substantial amounts of transmission rights-of-way and that the railroad

would not be used exclusively for coal hauling.) The life expectancy of the plant in either case is 30 years. These impacts can vary widely depending on the quality of the coal, the thickness of the seam, etc.

ORGANIC WASTE AND TRASH INCINERATION

Combustible garbage, trash, and other municipal wastes are abundant in every populated area. A large portion of the mixed garbage and wastes now being thrown away is combustible and could be used as a fuel in steam turbine generating plants. Lane County, Oregon, is now conducting studies for a resource recovery complex that will take the 500 to 600 tons per day of municipal wastes and process the organic material into fuel that can be mixed with wood wastes and then burned in existing boilers owned by Eugene Water and Electric Board. The light fraction would comprise about 15-25 percent of the total fuel. The existing EWEB plant has a 25 megawatt capacity. Since waste is largely generated near load centers, economics would favor location in populated areas but concern for ambient air quality standards might dictate location elsewhere.

Many of the larger Pacific Northwest cities may have the economic potential to utilize this resource to provide a useful, although minor, amount of generating capacity. The major environmental problems associated with this type of generation include atmospheric emissions and heat dissipated through cooling water. On the other hand, this concept has several pleasing external benefits, notably, reduced usage of land for sanitary landfills, reduction of solid wastes, and use of a fuel source which would have otherwise been wasted, thus conserving dwindling fossil fuel resources.

GEOTHERMAL

The Pacific Northwest has been endowed with a large part of the geothermal resource areas. There are 136,500 acres in the Pacific Northwest classified as KGRA (7.5 percent of the national KGRA resources) and 40,284,000 acres in areas of prospective value (40.7 percent of all national areas so classified).

The siting of any future geothermal generating facilities would be confined to those areas of greatest geothermal potential, which may or may not be near load centers. Such facilities could be tied in with the existing grid, however, and benefit the whole region. Investigation of this resource has only recently begun in the Pacific Northwest. Considerable test drilling will be required before the exact potential is known. However, a relatively small percentage of regional demands could be met from this source by 1995, and not in time to meet Pacific's stated time frame.

COMBUSTION TURBINES

Combustion turbine plants are fueled by either oil or natural gas. All of the fuel must therefore be imported into the region, and the fuels are currently scarce. Their availability as a generating resource to the Pacific Northwest is dependent upon the availability of the fuel they burn.

Physical siting considerations are minimal for combustion turbines. The primary considerations in siting are the noise and air quality standards in the area where the facility is to be located and a ready access to an adequate fuel supply. Turbine generators are quick and easy to install (12-18 months as opposed to 5-21 years for other types of thermal plants). They represent a low initial capital expenditure per kilowatt of generation installed, although they are very expensive per kilowatt-hour produced. Combustion turbines can be located relatively close to load centers and linked to existing transmission facilities. Furthermore, flexibility of design means that generating plants can be easily expanded in units of as little as 50-60 MW as the load situation changes. Land requirements for the plant site are minimal, being about 100 acres for 1,000 MW of capacity.

The major impacts of combustion turbines are air emissions and noise. Four 250 MW combustion turbine units operating at full capacity for 15 percent of the year would emit about 11,000 tons of air emissions in addition to the emissions during extraction and refining operations. The noise level at a typical site at a distance of 1,200 feet while the turbines are operating at capacity would be 65-70 decibels.

Since the combustion process itself drives the turbines directly, there is no need for cooling water; thus combustion turbines need not be located near a cooling water source. The very configuration of combustion turbines allows them to burn various types of fuels. In addition, combustion turbines can operate remotely and can be quickly started, making them very suitable for meeting peaking and reserve power requirements.

The main limitation of combustion turbines is their high cost of operation and maintenance and the rate of consumption of scarce fuel. Combustion turbines consume the most expensive and scarcest kinds of fuels: Natural gas, and light and middle distillate oils (they can be adapted for residual and crude oils). Despite the initial low capital cost associated with combustion turbine generators, the high operating cost resulting from the expensive fuels used makes this kind of electrical generation very expensive, ranging from 25-35 mills per kilowatt-hour for fuel. To this must be added the costs of operation and maintenance. Even for addition of steam generation utilizing the combustion turbine exhaust heat would still involve the consumption of valuable oil or gas which, it has been argued, should be prudently reserved for other purposes.

A combustion turbine plant (such as that at Harborton near Portland, Oregon) rated at 254 megawatts, burns 20,000 gallons of fuel oil per hour. An oil-fired steam electric plant, which is much more costly to build, would burn 20-25 percent less oil. Consumption like this possibly can be tolerated for peaking purposes, emergencies, or for meeting interim shortages until other generating facilities are on line, but it is argued that such a prodigious consumption of scarce petroleum fuels is a very expensive way to meet long-term firm requirements.

OTHER

Other forms of electrical generating facilities such as solar (sun, wind and tidal), thermonuclear fusion and fission, magnetohydrodynamics

and fuel cells, are still in varying stages of research and development. None would be available within Pacific's stated time frame.

REDUCE MARKET DEMAND

This information was excerpted from Bonneville Power Administration's Environmental Statement, General Construction and Maintenance Program, August 19, 1974. This report is primarily concerned with transmission systems, but the concepts are equally applicable to the inclusion of generating facilities, and to any electric utility.

Limiting Consumption of Electricity

An alternative which could reduce the size and number of new transmission facilities needed to serve the region is a reduction in consumption of electricity. In general, a reduction in peak demand could defer the need for a new facility. The length of the potential deferral depends upon the relative size of the reduction in demand achieved. A sizeable enough reduction in demand could, in theory, eliminate the need for a facility.

A reduction in consumption of electricity could be achieved in several different ways: (1) government or utility moral persuasion and resulting voluntary self-rationing; (2) economic incentives through pricing tehniques; (3) reduction in quality of service; and (4) government or utility regulation. Which one or combination of these techniques can be used by BPA at a given time depends on the legislation, regulations, and National policies which provide the guidelines within which BPA's program must be conducted.

Voluntary Self-Rationing

Consumer self-rationing through public appeals for curtailment in the use of nonessential electric appliances and restraint in all forms of electrical consumption has been used in several major metropolitan centers during periods of critical power shortage. During the colder-than-average weather of December 1972, a major utility serving the Puget Sound area reported that it could identify a definite reduction in peakloads of approximately 2.4 percent as a direct result of (1) curtailment of display and office lighting in the utility's own office building, substations, etc.; (2) notification of the utility's employees of the need to conserve energy; and (3) requests on an individual basis of all larger customers to reduce nonessential load. However, it should be noted that these efforts occurred in situations where curtailment was temporary, imposed only long enough to overcome a short-run emergency deficit in power supply.

Self-rationing was also successful in the Pacific Northwest during the slightly longer September-December 1973 period, when the region faced a 7.5 percent hydroelectric energy deficiency due to delays in generator installation schedules and insufficient water in its reservoirs. At that time, loads under-ran estimates by an average of 7.1 percent. This was helped substantially by the aggressive publicity given energy conservation by BPA, the utilities, state and local governments, and the news media.

Once the deficit in hydroelectric energy was erased in midJanuary 1974, by heavy precipitation and voluntary conservation efforts, energy-saving efforts eased off to an average of 3.4 percent for January to April 1974.

The energy situation has become more complex since the Northwest first experienced its electrical energy shortage in August 1973. Critical shortages of natural gas and oil occurred in this region as well as in other parts of the country later in that year. As a result, indications are that because of the shortage of oil and natural gas and the magnitude and rapidity of the increase in price of these fossil fuels, some consumers have been shifting to electricity as an energy source. There has been an increase in the use of electric space heating by residential consumers, both in new houses and in conversions from other heating systems in existing homes. In addition, industrial plants, which had planned fossil fuel fired boilers, have shifted to electricity because of the uncertainty of obtaining energy from other sources. As a result, savings which will be achieved in the future through voluntary self-rationing will probably be offset for the most part by consumers rationing their use of fossil fuels through use of electricity as an alternative.

BPA has an ongoing program of encouraging voluntary reductions in nonessential load. It distributes written material concerning conservation of energy to its customers and assists in programs designed to disseminate this information to the general public. Appeals to residents and businesses of the region for voluntary assistance in reducing loads are made by staff personnel via news media or group presentations.

However, substantially greater reductions in consumption than those outlined above would be required to facilitate significant deferrals or reductions in required transmission facilities. There is considerable doubt that self-imposed rationing over extended periods would achieve even the modest levels of reduction experienced during temporary power shortages, particularly when shortages in the hydroelectric system are absent.

Economic Incentives

Because of the consumption of electricity is to some degree responsive to price, particularly in the long range, it is possible to influence demand and energy consumption by altering rate structures or relative prices. Most utilities believe that electricity rates should be based primarily on the costs of serving each customer or class of customer. Cost-of-service rates generally discourage wasteful use of electricity by allocating to each customer the proper costs associated with his consumption of electricity. When rates are not based on cost of service, some customers will receive electricity at a price below the cost of production, at the expense of others who will pay penalties. Those receiving the subsidy will increase their consumption beyond what it would otherwise be and thereby compel the installation of additional generation, transmission, and distribution facilities. Presumably, those customers whose electric bills are higher than they would be with cost-of-service rates will consume less electricity than otherwise, offsetting to some extent the need for additional facilities.

Reduction in Quality of Service

An alternative means of reducing consumption would be to reduce the quality of service provided to consumers. The region's utilities presently strive to fulfill the responsibilities of providing adequate supplies of electricity at appropriate constant voltage levels, as do utilities nationwide. This general utility obligation could be changed by law to allow (a) planned reductions in voltage, or (b) planned blackouts of selected areas or selected uses during periods of peak demand.

An estimate prepared by BPA some years ago concluded that the net effect in regional energy savings resulting from an across-the-board 5 percent reduction in distribution system voltage would be on the order of 3 to 4 percent. At the same time, peak demands might be reduced by as much as 6 or 7 percent. This could in turn allow corresponding reductions in the need for facilities. However, these savings would be achieved at the cost of a lower grade of service and a reduction in the use life of some types of motor-operated electrical appliances, including washing machines and refrigerators. Voltage reductions to industrial customers could lead to reduced production and even some unemployment. Similar disadvantages would result from planned outages.

Utility or Government Regulation

Still another means of reducing consumption would entail some regulatory agency directly or indirectly controlling use of electricity. Laws could be passed limiting or outlawing the sale of certain "luxury" electrical appliances, and minimum levels of efficiency for appliances could be established. Sales to large industrial and commercial users could be limited by law.

This approach raises a number of social issues. While most reasonable persons agree that wasteful or frivolous use of energy should be discouraged, general agreement on what constitutes waste and frivolity is not so prevalent. Some agency would have to determine which uses were wasteful and frivolous and therefore susceptible to curtailment. This has not been a function of utilities in the past, and regulated utilities have been expressly prohibited from performing this function. Because such a system would restrict the activities of the public, it is probably more appropriate that such decisions be carried out through the political process.

To avoid the problem of establishing a new regulatory agency, a quota system of rationing could be used. Such a system would most likely entail a uniform percentage reduction for all consumers of electricity. The reduction in need for facilities, and thus the environmental impacts avoided, would depend on the severity of the rationing. For consumers who viewed some of their consumption as marginally useful and sacrifice would be relatively insignificant. However, for those consumers who confine their use of electricity to uses they feel are essential and indispensable, the sacrifice would be great.

UPGRADE EXISTING TRANSMISSION FACILITIES

There are no direct transmission facilities between southern Idaho (Midpoint substation) and southwestern Oregon.

The existing transmission grid between Idaho and the Pacific Northwest is composed of a series of lower voltage transmission lines of differing ownership.

Idaho Power Company owns and operates three 230 KV lines between the Midpoint substation and Boise. It also operates a 138 KV line between a substation at Mountain Home and Boise. From the Boise substation, distribution lines of 69 KV capacity connect to such places as Nampa, Mora, etc. A 69 KV line connects Swan Falls dam and Ware, a small substation near Melba.

Between the generating facility at Brownlee Dam generating facility at Brownlee Dam and Boise, Idaho Power Company has four 230 KV lines, as well as one 230 KV line on westerly to La Grande. Between La Grande and Mc Nary, Bonneville Power Administration owns and operates one 230 KV line.

Between the Mc Nary - Dalles area on the Columbia River and the Portland area the transmission grid is primarily a part of the BPA system.

The north-south intertie between the Dalles - Grizzly to Malin area is composed of two 500 KV lines. Between the Dalles and Grizzly they are owned by BPA and between Grizzly and Malin, BPA and Portland General Electric company each owns one of the lines.

In order to transmit electrical energy from southern Idaho to southwestern Oregon along the existing transmission network would require new construction because the existing lines are presently operated at capacity. It would also not appear practical to retire existing lines all the way between southern Idaho and the Northwest and replace them with higher-capacity, higher-voltage lines as many of the existing lines are needed to serve local loads. It would also be very expensive to provide the required transformation to connect to local systems. In addition, system stability could be a problem if only higher-voltage lines would traverse an area without adequate strengthening of the total system. This would mean that more higher-voltage lines transmission facilities would be required than would first appear necessary.

Construction of a new transmission facility, following the existing grid, would result in environmental impacts similar to those described in Chapter III.

To follow the existing grid from Midpoint - Boise - Brownlee - Mc Nary - Portland area and south through the Willamette Valley to the Medford area would require new construction for approximately 785 miles.

To follow the existing network between Midpoint and Mc Nary - Dalles and south along the intertie to Malin and on to Medford would require new construction for approximately 777 miles.

Because of additional length, and the increase in number of lines, environmental impacts could vary in magnitude, especially in the Willamette Valley area.

EFFECT OF "NO ACTION" ON MARKET AREA

Without the proposed project, the market area would be expected to develop an energy deficit before 1980. The present electric power transmission facilities are presently at or very near capacity according to Bonneville Power Administration. "Brownouts" and periodic power outages have occurred in the market area in recent years. Without a means to transmit more electrical power to the market area, it appears that these brownouts and power outages would increase in frequency and duration.

The market area has shown steady increases in population for over 30 years and the outlook is for continued population growth. If past trends continue, Jackson and Josephine counties, for instance, would probably increase from a 1970 population of 130,279 to over 160,000 in 1980 and almost 200,000 by 1990 (refer to Table II-54 and Figure II-51). Use of the electric power is also expected to increase. Based on historical records of power use and recent trends, it appears the demand for power will increase at a rate of about 4.8% annually as described in the Market area was 415 MW in 1974. Based on the historical information and assuming past trends are largely continued, average energy use in the Southwestern Division would approximate 685 to 700 MW by 1985. If additional electric power were not supplied to the market area, an average energy deficit of about 273 MW would be expected. Peak demand would be expected to exceed 1500 MW by 1985.

If no action is taken, i.e. no transmission facilities are constructed to transport electrical energy to the market area, and no other energy sources are constructed, an energy deficit would result. This shortage of energy would generally result in reduced industrial output of goods, reduced employment, unreliable power for residential heating, cooling, refrigeration of foods. A power deficit would be expected to develop incrementally. "Brownouts" and periodic power outages would probably increase in frequency and duration. The general impact of a progressive electric energy deficit contribute toward a general deterioration of the quality of life in the market area, including curtailment in use of anti-pollution devices. The magnitude of economic decline and the decrease in the quality of life would be in proportion to the duration and magnitude of an energy deficit.

MINOR REALIGNMENTS OF PROPOSED ROUTE

Discussion as to four minor realignments of Pacific's proposed route follows. These would be minor adjustments, within the same general area, and not considered to be alternate routes.

Bruneau Sand Dunes

Adjust the proposed right-of-way to cross approximately 2 miles south of the southeast corner of the existing Bruneau Sand Dunes State National Park as indicated by FIGURE VIII-36.

Adjustment of the route would reduce the crossing of lands identified for potential inclusion to the park from approximately 3.5 miles to 2.0 miles. Adjustment of the route, together with utilization of natural terrain screening, would lessen the visual impact for the existing park, particularly from the top and southern slopes of the park's primary dune formation. No measurable change or effect on vegetation, wildlife, soils, water, topography, geology, history or archaeology would occur over that described for the proposed route. Adjustment would reduce required right-of-way approximately .75 miles. Adjustment would increase the hazard of aircraft collisions during low-level night flight training at Saylor Creek Air Force Range. Technical details regarding increased hazard potential to military aircraft is not available. However, one collision alone would result in the loss of life and several million dollars.

Jordan Creek Area

Adjust the proposed right-of-way to cross approximately .5 mile south of Jordan Creek as indicated by FIGURE VIII-37.

Adjustment of the route would avoid visual impacts resulting from skyline visibility on Jordan Creek canyon rims as seen from the creek bottom. No measurable change or effect on vegetation, wildlife, soils, water, topography, geology, history or archaeology would occur over that described for the proposed route. No significant change in required right-of-way mileage would occur.

Goose Lake Valley

Adjust the proposed right-of-way approximately 2 miles north through the Warner Mountains and Goose Lake Valley areas as indicated by FIGURE VIII-38.

Adjustment of the route would eliminate the visual impacts resulting from the "angular" crossing of the open Camas Prairi. as seen from State Highway 140; eliminate the visual impacts resulting from partial visibility of towers and conductors as seen from parallel State Highway 140 through the Warner Mountains; and eliminate the primary visual impacts on the Warner ski area. Adjustment, in addition to providing improved concealment through the Warner Mountains, would reduce Goose Lake Valley visual impacts through locating the route in area of existing natural landscape intrusions, including the Lakeview refuse disposal site. Adjustment would increase the acreage of commercial timberland removed from production by an estimated 20 acres and

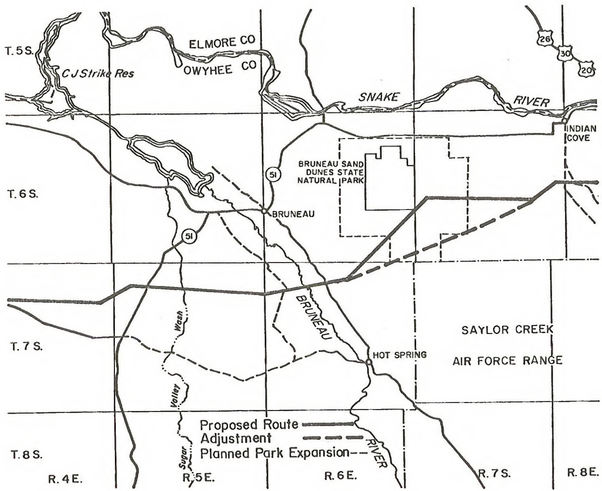


FIGURE VIII- 36

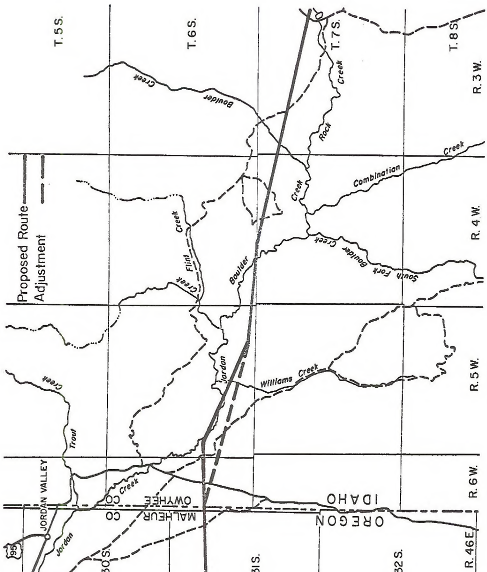


FIGURE VIII- 37

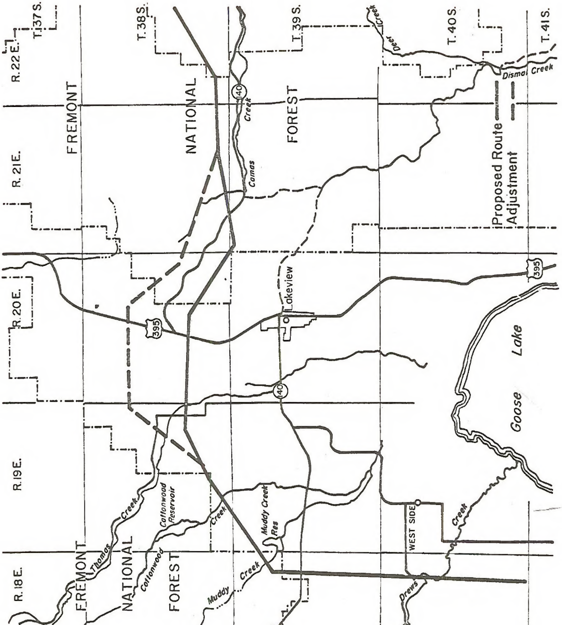


FIGURE VIII-38

agriculture land removed from production by an estimated 0.2 acres. No significant change or effect on wildlife, soils, water, topography, geology, history or archaeology would occur over the proposed route. Adjustment would increase required right-of-way by approximately 2.25 miles.

Yokum Valley

Adjust the proposed right-of-way approximately 1 mile north in the Yokum Valley of the Fremont National Forest as indicated by FIGURE VIII-39.

Adjustment would relocate the right-of-way off timbered slopes into a fringe area of an open valley and reduce visual impacts resulting from right-of-way clearing of the mixed conifer vegetative type, including the creation of visual contrast and tunnel effect. Adjustment would reduce the commercial timberland removed from production by an estimated 60 acres. No significant change or effect on wildlife, soils, water, topography, geology, history or archaeology would occur over that described for the proposed route. No significant change in required right-of-way mileage would occur.

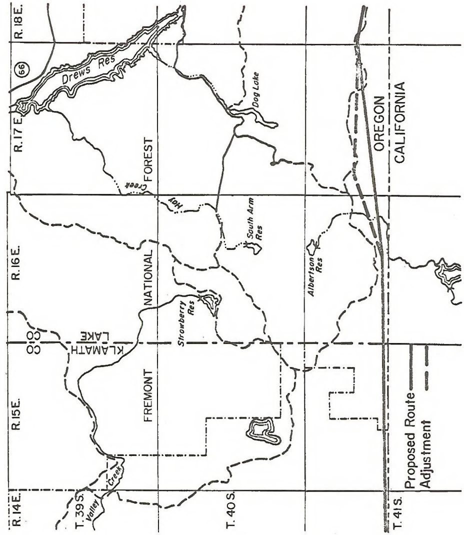


FIGURE VIII-39

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